Trains

June
1945

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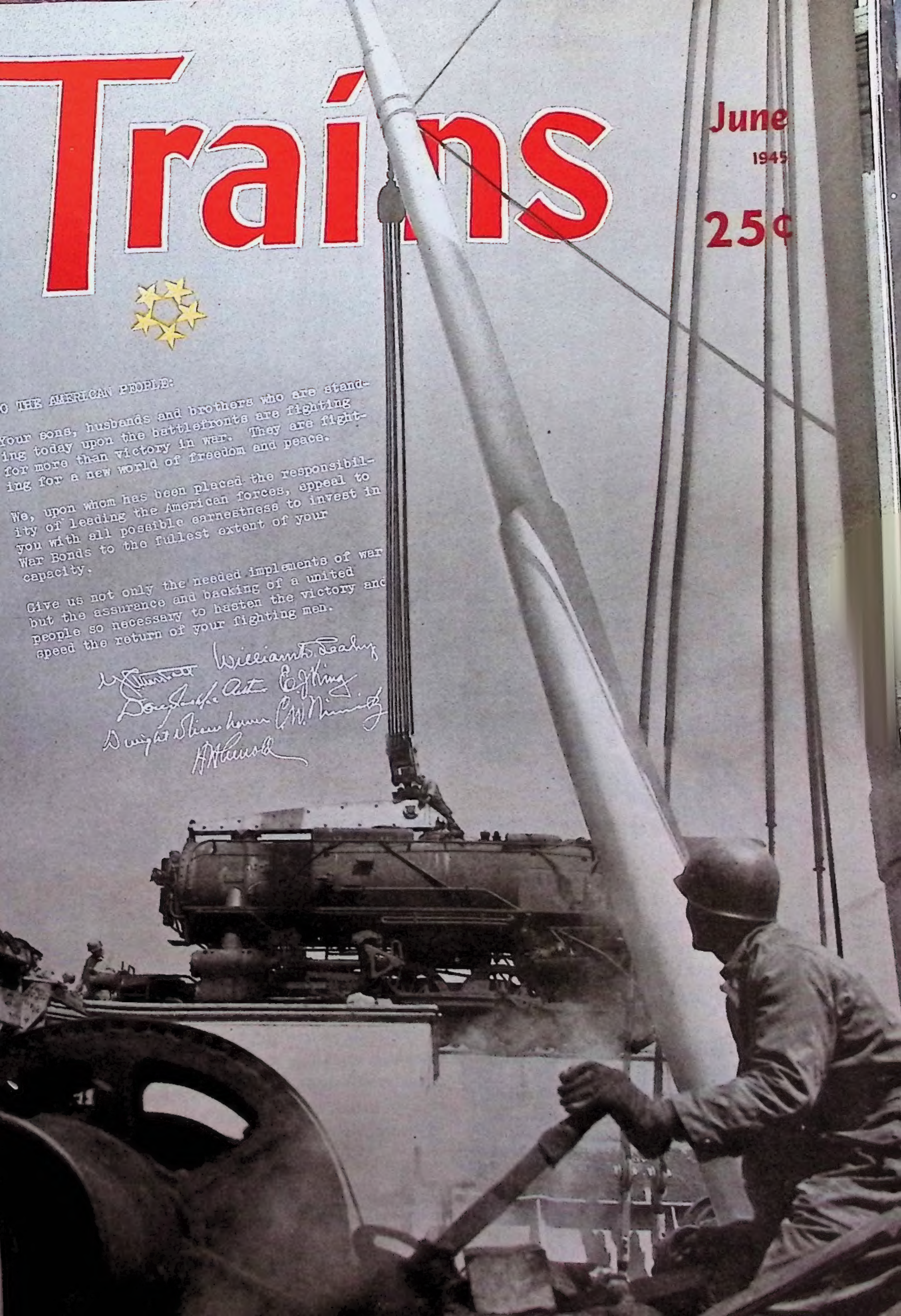

Nine miles of short curves and steep grades through the Ozark Mountains have been tamed by Frisco's Dixon Hill project, at a cost of more than $1,300,000.

Coming 'round the Mountain

...ON NEW TRACK

Along the Frisco Lines, extensive improvements, costing millions of dollars, are being made. Included is such work as relocating right-of-way and track to reduce grades and curves ...improved Centralized Traffic Control... modernizing stations... placing heavier track, reballasting roadbed... and many other forward-looking projects.

This progressive modernization program is enabling Frisco to handle its war traffic more efficiently and will be of inestimable value to the great 9-State Frisco territory after peace.

FRISCO LINES

ST. LOUIS-SAN FRANCISCO RY.

A Great Railroad

Quick – what's it pulling, boxcars or berths?

EVEN a railroad man couldn't tell —until he sees more of the train than the locomotive.

For this particular locomotive—built by American Locomotive and General Electric for the New Haven—is the product of an important development.

You see, for years the railroads have had to bear the terrific expense of buying and maintaining different types of locomotives for freight and passenger service. But today—as a result of American Locomotive's hundred years of experience in railroading—this problem is gradually being licked.

Locomotives are now being built that are *interchangeable* between passenger and freight trains. And they may be Diesel-electric or steam or any modification of either type. It doesn't matter whether they use oil or coal—the important thing is economy of performance.

This development helps reduce the number of locomotives a railroad must buy and maintain. And that's important to you. For it is out of a railroad's *savings* that improvements in service can be offered.

This is just one of many developments that will contribute to finer post-war railroading. And it is significant that it comes from the Company that gave America its first Diesel locomotive, built the world's largest steam locomotive, and has supplied an important share of the locomotives being used for war purposes by the United Nations.

American Locomotive

Alco

THE MARK OF MODERN LOCOMOTION

Trains

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American railroads produce the world's most efficient common-carrier mass transportation and are the foundation of our country's industrial productivity.

SOME 50 passenger trains have been discontinued under the O.D.T. order prohibiting the operation of passenger trains which have not averaged better than 35 per cent occupancy. The O.D.T. announces that this is saving approximately 5500 train-miles a day, with an annual saving for 38 trains on which statistics are available of 69,000 tons of coal.

The Chicago & Illinois Midland discontinued its two daily trains each way between Pekin (suburb of Peoria) and Springfield, which had been powered by modern American standard locomotives. Monon discontinued its only train service on the French Lick branch, and half its trains on the Chicago-Indianapolis and Chicago-Louisville lines. New York Central took four trains off the Buffalo-Suspension Bridge run. Western Maryland eliminated service beyond Cumberland to Elkins, W. Va. Many less busy trains on well serviced main lines felt the axe. O.D.T. said, "Discontinuance of the passenger trains has not resulted in any community being deprived of essential transportation." But some very rideable routes are now without passenger accommodations, and we hope the loss is not permanent.

Gulf, Mobile & Alton?

The Gulf, Mobile & Ohio has made arrangements to buy the Alton Railroad, and if it obtains approval of bondholders, courts and I.C.C. we will witness something seldom seen by this generation, the creation of a new major rail system whose rails will reach from Chicago and Kansas City through St. Louis to New Orleans and Mobile.

The 958-mile Alton has a double-track line between Chicago and St. Louis which for years has handled the largest share of passenger business between these two centers. For a time the road was part of the B&O system, but Alton went into trusteeship and B&O left the picture two years ago. The 1969-mile GM&O is already a product of recent consolidation. In 1940 aggressive President I. B. Tigrett brought his Gulf, Mobile & Northern and the Mobile & Ohio together into a lusty young road connecting New Orleans and Mobile with St. Louis. The streamlined *Rebels* are operated from St. Louis over both the New Orleans and Mobile routes.

New Orleans Streamliner

The Illinois Central plans a postwar daytime streamliner between Chicago and New Orleans. It will resemble the *City of Miami* and will be called the *City of New Orleans*. Departure will be early in the morning with same evening arrival. J. W. Stevenson, passenger traffic manager of the IC, says, "We believe the coach passenger will be a major factor in postwar railway passenger service." He believes the railroads will be in a preferred position to give this type of passenger everything he wants, because it takes only three or four horsepower per ton to pull a high speed passenger train, the lowest power ratio of any form of transportation.

Boston Rapid Transit Proposal

A special commission appointed by the Massachusetts legislature has recommended a state owned authority with power to unify all rapid transit facilities in the Boston area. Specific features of the plan would include use of certain steam railroad suburban lines as part of a suburban rapid transit system operating into the Boston subway lines instead of into North and South stations. The commission estimates that the cost of providing rapid transit facilities in this way, including electrification of trackage and construction of connections, would be about $33-600,000, and that highway construction to take care of the same passengers would cost $169 million, or about five times as much. "A rapid transit line produces direct revenue; a highway does not," the report observes.

The additional rapid transit railways would be based upon these existing steam railroad suburban lines:

Old Colony Railroad to Braintree.
New Haven main line to Dedham.
Boston & Albany Highland branch to Riverside and New Haven to Needham Jct.
B&A main line to Riverside.
B&M Watertown and Lexington branches to Arlington Heights.
B&M to Lynn, with some new construction on the abandoned narrow gauge Boston, Revere Beach & Lynn.
B&M via Somerville to Woburn.
B&M to Reading.

Rapid transit extensions on a similar plan, using certain steam railroad trackage, were also proposed for Cleveland a year ago. In many other large cities it is also probable that unifying suburban operation with local transportation would create better local service at low cost and would also benefit the steam roads by relieving them of expensive local service and providing fixed revenue from trackage leases.

Specials to San Francisco

On the recent cross-country San Francisco Conference specials (which were split between several railroads) most of the lines literally outdid themselves in an effort to impress the passengers. The D&RGW put a 5400-horsepower freight Diesel on the train it handled; the SP frequently had its three trains so close together that it was possible to line them up side by side at operating stops. The B&O pulled Diesels off the *Columbian* and ran all three of its trains with this type motive power. Equipment was in A-1 condition, dining cars were of the newest and most modern type and in short everything was done to provide a trip which the patrons would long remember in a favorable light.

B&O Station Change in Detroi

The B&O has applied for I.C.C. permission to move from Fort Street Union Station to the Michigan Central Station in Detroit. The change would be effective June 7 when the B&O's preser

C. A. Brown, Box 128, Rutledge, Pa.

The latest lot of 10 Governor class 4-8-4 locomotives for the RF&P were delivered to the road under their own power from the Baldwin Locomotive Works. Live delivery of steam locomotives has been rare in recent years. Some of the machines, resplendant with gold and blue striping, went via Pennsylvania and some via B&O. The William Byrd is shown backing from Baldwin's main gate to the B&O New York-Washington line.

contract expires. Trains would be operated into Detroit by B&O crews over the NYC from Toledo. At present they are handled into Detroit by Pere Marquette crews over PM tracks from Toledo.

Odds and Ends

The C&O has inaugurated two two-unit combinations of diner and kitchen-pantry-dormitory cars, using them eastbound on the Virginia section of the George Washington and westbound on the *FFV*. The new units were built in C&O shops from coaches for the diners and combination cars for the kitchen-dormitory units. . . The Union Pacific has spent $278 million in the three years since Pearl Harbor, including $41 million for new equipment: 200 cabooses 30 coaches, 30 baggage cars, 10 mail-baggage combines, 36 Diesel switchers, and 100 steam locomotives. The world's longest stretch of C.T.C. controlled from one point, the 302 miles from Daggett, Calif., to Caliente, Nev., was installed, and 1680 miles of rail were replaced. . . With the delivery of the last of their new 4-8-4's in May, the RF&P was expected to discontinue the operation of passenger Diesels between Richmond and Washington. The Diesels had been rented from the lines south of Richmond for use on their through trains. Now railfans of the nation's capital will be able to see the Diesels of only two lines instead of five.

There is no truth in rumors that American freight cars are being forwarded overseas loaded with export freight. All cars containing export freight have been, are, and will continue to be unloaded at the ports and returned to the interior for railroad use. Despite difficulties traceable to the severe snow storms in the East, more cars of freight are now being loaded and moved than at any corresponding season since the war began. . . The Atlantic Coast Line is among the roads which have redesigned timetables for greater legibility and convenience. Incidentally, this road's current folder says, "Passengers should always procure tickets at regular railroad ticket offices, as there are numerous expired and counterfeit tickets in the hands of unauthorized parties for sale, which, when presented, are rejected by conductors." . . The C&O's postwar streamlined train, to be pulled by the new steam-turbo-electric locomotives, will be specially designed for fast daylight travel between Washington and Cincinnati. . . Instead of using the locomotive whistle to call the mail clerk's attention to a bag pickup, the engineer of the MoPac's *Delta Eagle* merely presses a button which rings a bell in the R.P.O. compartment. Simple, and saves a lot of whistling. . . The C&O will install 84 miles of C.T.C. and 44 miles of additional automatic block signaling, the entire mileage of its branch from a junction near Ashland, Ky., to Elkhorn City where it connects with the Clinchfield Railroad.

The Illinois Central's streamlined *Panama Limited* is three years old. It was a war baby, ordered 18 months before Pearl Harbor but put in operation in 1942. The original steam powered *Panama* went into service in February, 1911. . . The last of 400 American freight locomotives lent to the British railways to ease the traffic burden during the time American troops were stationed in England had been sent to the European fronts some months before V-E day. . . The Rutland has ordered four 4-8-2 locomotives which will eliminate double-heading on heavy trains. . . The C&O has an extremely melodious whistle on its Hudson No. 307 and railfans along the line are hoping the same type whistle will be used on the new turbine locomotive. . . One of the five road Diesels on order for New York, Ontario & Western will be paid for by Standard Oil Development Company in return for performance data over a three-year period.

A. C. Kalmbach.

June, 1945 Volume 5 Number 8

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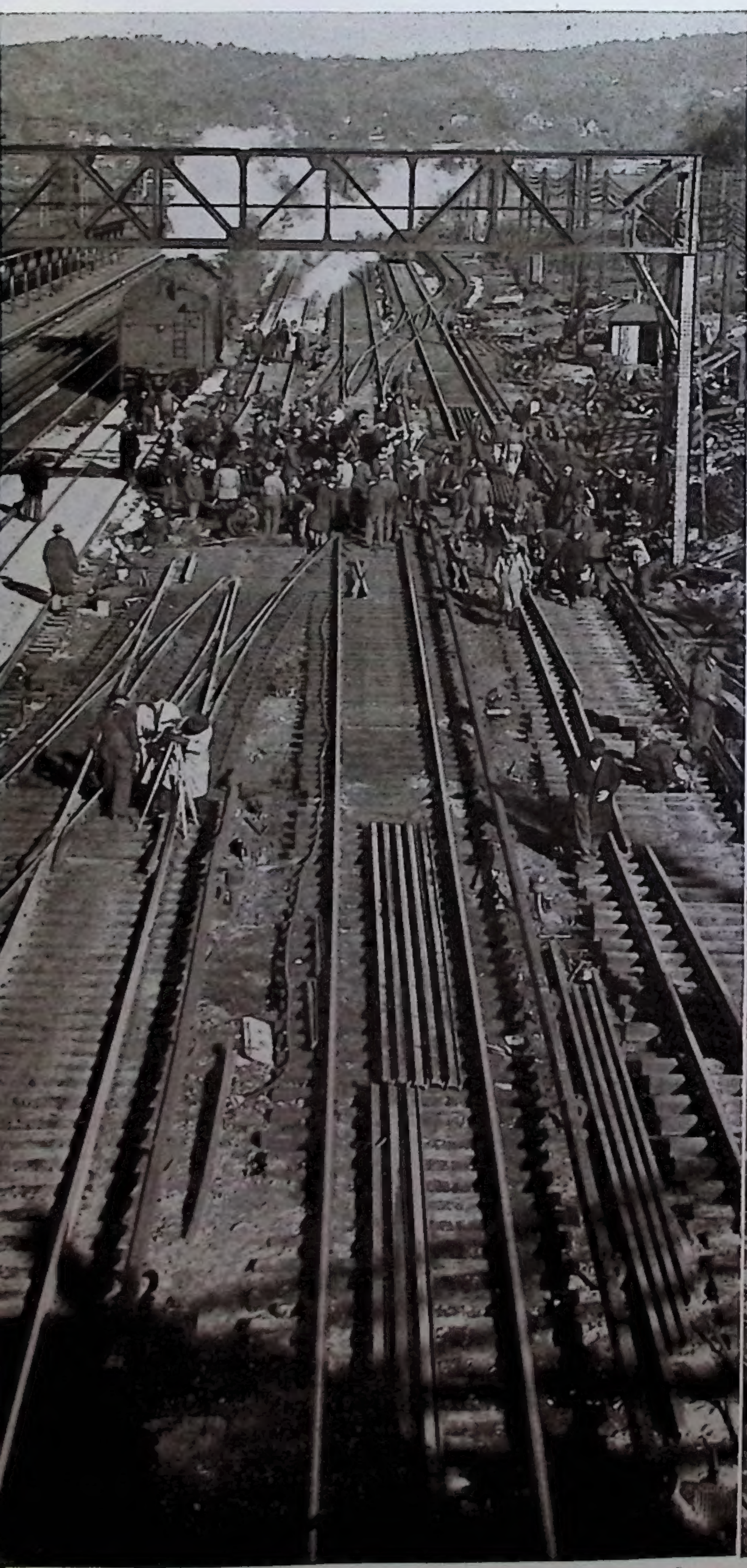


NYC Replaces

Track layout for changing locomotives at Harmon improved by new slip switches

By preassembling the new slip switch units and using two locomotive cranes to swing them into position as units the New York Central recently replaced the busy crossovers at Harmon, N. Y., without interfering with heavy mainline traffic. These double slip switches are used when steam locomotives are replaced by the electrics used in the New York terminal zone, or vice versa. The old No. 8 slip switches

Busy Switches

built of 105-pound rail had proved unsatisfactory in withstanding the wear imposed by the new Mohawk class L-4 locomotives and are replaced by No. 10 switches built of 127-pound rail.

The new slips, each weighing about 25 tons, were assembled complete with electric switch machines at a convenient location beside a yard track and were tested for operation. They were picked up and lowered into place with the aid of two 15-inch I beams to prevent the switch unit from bending. Careful computing work was needed to assure that the switches would fit exactly into the spaces provided, and especially to change the alignment of the entire ladder so that as the replacement progressed the new 10 in 1 angle would be formed.

LINES OF THE
Denver & Rio Grande Western
RAILROAD
Denver & Rio Grande Western
D&RGW narrow gauge lines
Other railroads
Abandoned railroads
Scale, 1" = 50 miles
Salt Lake City
Farmington
Provo
Mapleton
Thistle
Joint use with Utah RR
Soldier Summit
Castle Gate
Helper
Price
Mounds
Nephi
Manti
Ephraim
Sevier River
Wasatch Mts
Green River
Duchesne River
Green River
Yampa River
White River
Book Cliffs
Grand Valley
Ruby Canyon
Grand Junction
Gunnison River
Delta
Montrose
Black Canyon
Gunnison
Curecanti Needle
The narrow gauge circle
Ouray
Lake City
Silverton
Durango
Animas River
Dolores
Farmington
Formerly standard gauge
The narrow gauge circle
Colorado River
Glenwood Springs
Glenwood Canyon
Dotsero Cutoff
Eagle River
Eagle
Minturn
Dotsero
Orested
Hot Sulphur Springs
Track owned by D&SL
Middle Park
Steamboat Springs
Craig
North Park
North Platte River
Encampment
Laramie
Cheyenne
Fort Collins
Greeley
Boulder
Denver
Golden
Moffat Tunnel
Dillon
Leadville
Tennessee Pass
Holy Cross Mt
Aspen
Crested Butte
Gunnison
Marshall Pass
Salida
Canon City
Florence
Pueblo
Colorado Springs
Pikes Peak
Cripple Creek
South Park
Middle Park
Pacific
Front Range
Palmer Lake
Castle Rock
Littleton
Limon
Joint tracks with AT&SF and C&S
To Chicago
To Omaha
Ft Morgan
South Platte River
Arkansas River
Huerfano River
Joint use of C&S tracks here
Walsenburg
Trinidad
Raton Pass
Alamosa
Monte Vista
San Luis Valley
Rio Grande
Sangre de Cristo Mts
San Juan Mts
Antonito
Line to Antonito and Santa Fe abandoned
To Chicago
Purgatoire River
To Texas
To California
To California
Wyoming
Utah
Colorado
Nebraska
Arizona
New Mexico

THE RIO GRANDE

General Palmer's little narrow gauge road of the Colorado mountains grew into one of America's most important "bridge" systems

BY CARL B. HEWETT

Denver & Rio Grande Western train No. 1, the *Scenic Limited*, in its run from Denver to Ogden via Pueblo and the Royal Gorge, travels 4.63 miles vertically in the process of being lifted a total of 11,709 feet and lowered 12,765 feet. Those 4.63 vertical miles represent more of an operating problem in terms of horsepower, manpower and brakepower than the entire 782 linear miles. They cost money, too. Lots of it. Take coal consumption for instance. The national average is 240.8 pounds of coal per mile for a 14-car passenger train. The Rio Grande system average is 320 pounds, while unusually severe sections, such as Helper-Provo, require 424.2 pounds per mile. For 74 years the Rio Grande has been solving innumerable problems unheard of in flat land railroading.

The Rio Grande is one of seven steel highways of commerce that serve alike in war and peace to bind the nation together across the backbone of the continent. Most of these seven railroads were surveyed along routes that provided relatively low crossings of the North American Corderilla. That wasn't the case, in all aspects, with the Rio Grande, due to circumstances that we'll go into later. Of all the transmountain systems, it alone plunges straight into the heart of the highest Rockies as if deliberately seeking the presence of storm-tossed peaks and the solitude of vast granite canyons.

Pikes Peak dominates the scene for 160 miles as the *Scenic Limited* makes its way from Denver through Pueblo to Canon City in the morning and early afternoon. There the last vestige of the Great Plains is left behind. The gargantuan portals of the Royal Gorge close in and the *Scenic* enters a world all its own, threading the shadowy depths of the narrow, twisting gorge, under the world's highest bridge, and then out into the sunlight of the upper Arkansas Valley, surrounded by a veritable forest of 14,000 foot peaks.

The Royal Gorge is one of the world's best known scenic attractions, but still it is only one of many spectacular scenes that unfold in kaleidoscopic succession as the *Scenic* squirms along mountain sides and through canyons. Salida, nestled at the foot of Tenderfoot Mountain and proudly advertising its position in "The Heart of the Rockies," boasts a handsome new depot with a semicircular waiting room whose windows frame a magnificent panorama of Mount Shavano's Snow Angel.

Buena Vista claims the College Peaks for its own, and a short distance past there the *Scenic* enters the Upper Gorge of the Arkansas which eventually widens out in a level valley at Malta between lordly Mounts Elbert and Massive, and the Park Range. Old two-mile high Leadville, five miles away and 680 feet higher, broods over its gold and silver past up on the slopes of Carbonate Hill.

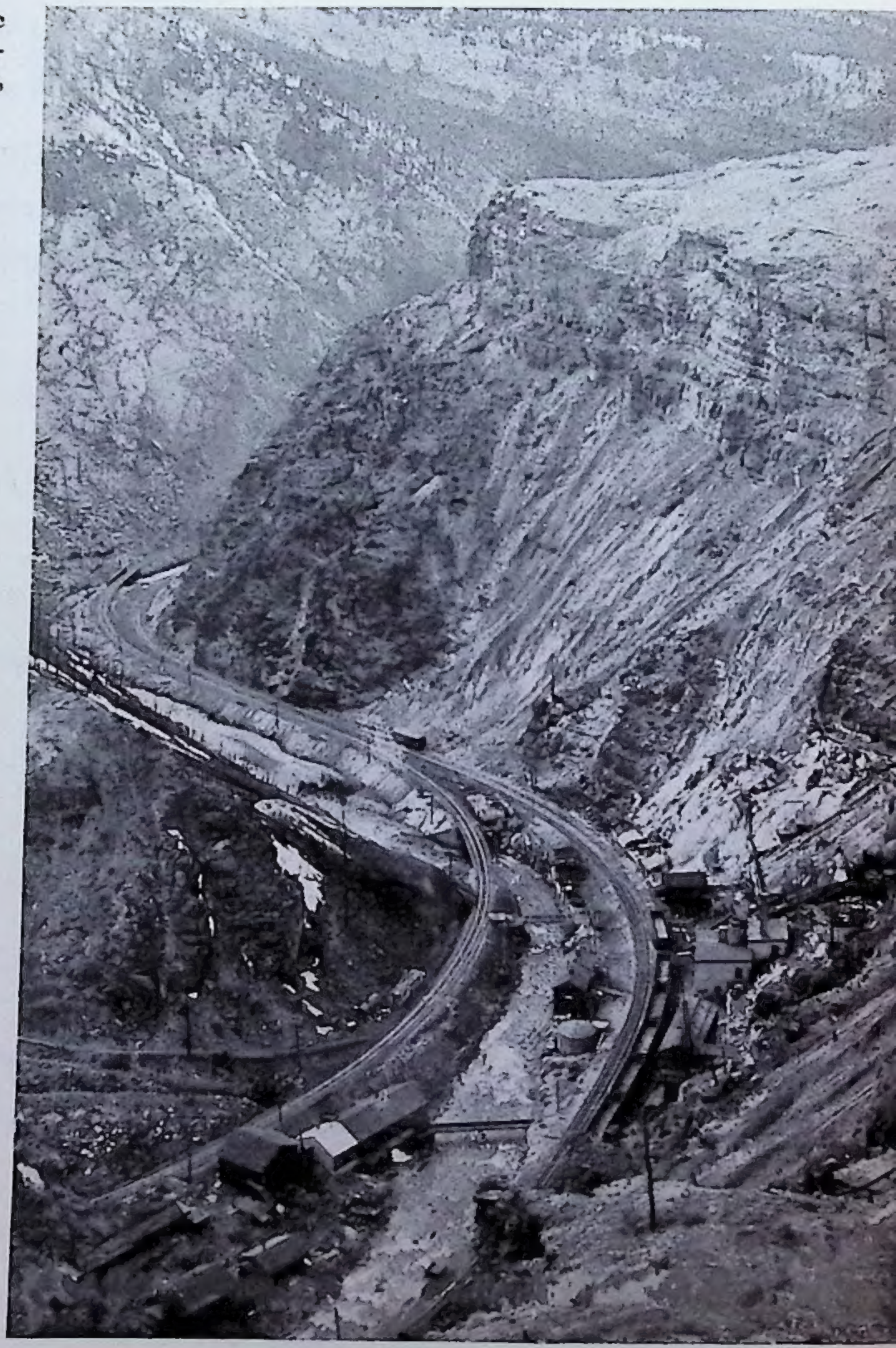
Tennessee Pass and the summit tunnel (10,040 feet elevation, on the Continental Divide) are followed by the steep double track leading down to the Eagle River, past Pando where Uncle Sam built a vast Army ski training camp on the terminal moraine of an ancient glacier.

Precipitous Red Cliff wedges itself under the huge steel arch on which the highway leaps high across the portals of Eagle River Canyon to find a precarious foothold along the stormy face of Battle Mountain far above the river. This canyon is so narrow for most of its length that the railroad divides and one track is laid on each side of the brawling stream. At Belden the Empire Zinc Co. was obliged to burrow into the canyon wall and construct a large reduction plant entirely underground.

The canyon opens out into a rock walled valley below Minturn and the gradient tapers off to a mere one per cent more or less. At Dotsero the Moffat Tunnel route slashes across the base of an extinct volcano and joins the Gorge route to swell the stream of traffic to a torrent that roars day and night up and down the alternate valleys and canyons of the Colorado River.

Glenwood Canyon and Glenwood Springs mark the entrance to a long and prosperous valley, full of dude ranches, coal mines, lumbering,

Two views of the main line in Eagle River Canyon just west of Tennessee Pass. Both show the same spot, but one is 30 years ago.



Sanborn, courtesy C. B. Hewett.

orchards and mixed farms all sheltered under the castellated escarpment of the Grand Mesa. Then De Beque Canyon and Palisade and a 13-mile lane of peach orchards lead straight into Grand Junction.

Surroundings change again as the *Scenic* roars on through the night out of Colorado into Utah, hard on the heels of both sections of the California bound *Exposition Flyer*. Colorado's Spanish background gives way to a land of ecclesiastical place names and Scandanavian folk names, where Brigham Young's thrifty followers obeyed their great leader's exhortation to make the desert blossom.

Coal mines and the rocky portals of Castle Gate indicate the start of the steep climb up the twisting depths of Price Canyon to Soldier Summit. Then in the early morning the *Scenic* zigzags down the big ladder on the western side of the Wasatch Plateau, picks up speed as the level floor of the Salt Lake Valley is reached, speeds along between the shores of Utah Lake and the bulk of mighty Timpanogos, down the River Jordon to Salt Lake City and then along the shore of the Great Salt Lake to Ogden.

HERE'S exciting railroad history in the story of the Rio Grande. Scarcely a rail length but has its own peculiar tale. It's a rather long story, how it was made possible for a railroad to climb across the roof of the nation and still compete with other roads that follow less strenuous routes.

Several factors compensate in favor of the Grande. One, of course, is the multitude of almost unbelievable scenic attractions this route offers. Another is temperature. Mountain areas traversed by the Rio Grande in Utah and Colorado provide a route air conditioned by nature, always delightfully cool in summer, attractive alike to travelers and shippers of perishables.

Another highly favorable factor is strategic location. Take a look at the map. You do not have to be a student of logistics to appreciate the strategic importance of the Salt Lake Valley in the conduct of war in the Pacific. Four major routes radiate spokelike to southern California, San Francisco Bay, Puget Sound and the Alaska highway. Supplies concentrated there can be rushed in any of those direc-

L. C. McClure, 2128 Glenarm Pl., Denver, Colo.

tions as required. Straight into the heart of this beehive of wartime activity the Rio Grande pours an endless flood of traffic that flows into Denver and Pueblo over the Burlington, Rock Island, Missouri Pacific, Santa Fe and Colorado & Southern. That isn't all either. The Rio Grande's main line between Denver and Pueblo is also an indispensible link in the westernmost north-south route east of the Rockies.

On a map, the Royal Gorge route gives the impression of being a railroad that started out in one direction and then changed its mind and wound up somewhere else. Contrary to popular impression, that isn't quite what happened. Actually, according to the original certificate of incorporation, the Rio Grande was to have seven routes centering in or near Pueblo. One of these, indeed, was to cross Raton Pass and go to Mexico City, but the Santa Fe got the pass first. Another was to branch off this line and build through to Los Angeles via almost the same route later used by the Santa Fe. One of the routes, to be known as the Western Colorado Railroad, was very accurately projected along the present course of the Royal Gorge route all the way to Salt Lake City.

The Gorge route owes its existence principally to the vision and perserverance of a far seeing and indomitable man, General William Jackson Palmer.

General Palmer was well educated in railroad surveying and construction. In 1858, at the age of 22, he became secretary to the president of the Pennsylvania Railroad. Upon the outbreak of the Civil War he entered the Union Army, achieved a brilliant record and rose to the rank of brigadier general at 28. After the war, when the Kansas Pacific Railroad was organized, the capable young veteran was appointed its treasurer, director of surveys and manager of construction. In 1870, his Denver-bound construction crews set a new record by grading and laying 150 miles of track in 92 days through country infested with Indians sufficiently hostile to scalp 80 workmen in one attack. General Palmer was visionary but intensely practical. His head was in the clouds but he always kept both feet firmly on the ground.

The Rio Grande first makes its appearance in recorded history when General Palmer, in his annual report to the Union Pacific (Eastern Division) directors for 1868, advocated building railroads from Pueblo to Salt Lake City, Mexico City and Los Angeles. Evidently the directors didn't concur so we next find the general, after completion of the Kansas Pacific to Denver in 1870, busily organizing his own company for the purpose of building the lines he had recommended. The fact that his railroad system would have to be built through thousands of miles of uninhabited wilderness was no serious obstacle to General Palmer. His all-comprehensive inspiration was already busy peopling the vast emptiness with cities and industries.

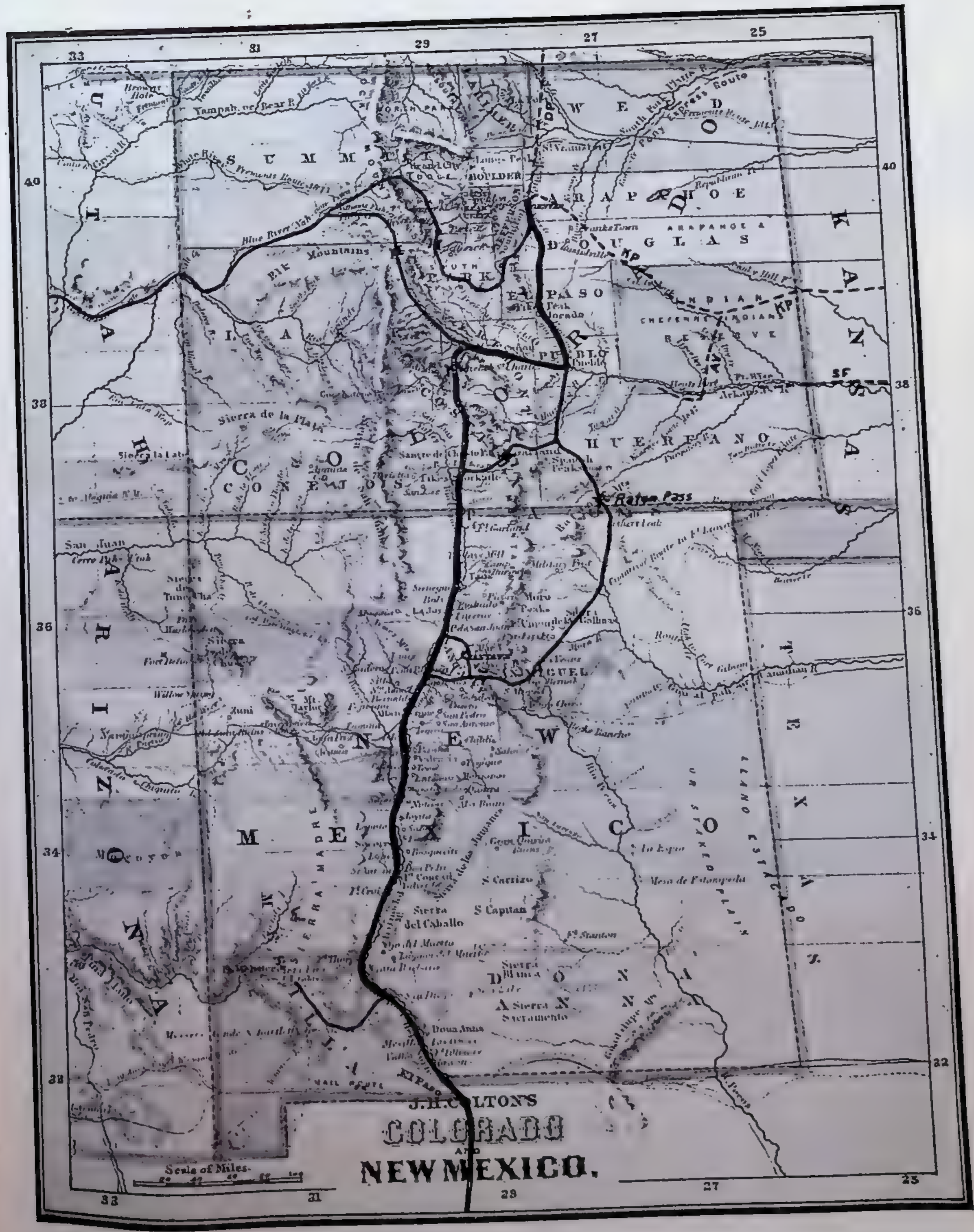
In those days, considerable attention was being attracted in the railroad world by the successful and profitable operation of the Festiniog Railway in the mountains of Wales. This little pike, with a gauge of only 23½ inches, traversing 49-degree 54-minute curves, was proving that narrow gauge railways offered a low cost solution to the problem of building tracks in sparsely inhabited mountainous country where the cost of building to a broader gauge would be unprofitable. General Palmer and his associates were prompt to seize upon the narrow gauge idea in planning their new railroad.

The Denver & Rio Grande Railway Co. was incorporated October 27, 1870, with General Palmer assuming the presidency of the company. His principal associates were Gov. A. C. Hunt, Col. D. C. Dodge and Col. W. H. Greenwood. Construction was commenced at Denver in March, 1871. People dubbed it the "baby railroad" as soon as it began to take form. Its gauge of only three feet was a radical innovation in an age when some American railroads were using a gauge of six feet. The tendency toward large motive power was already becoming increasingly evident throughout the land and by way of contrast the little Rio Grande trains of four-wheel boxcars, each only 12 feet long, running along their brittle tracks of 32-pound Welsh rails, appeared more like playthings than practical equipment intended for one of the toughest jobs of railroading ever attempted.

The Grande was a radical innovation in more ways than one. Not only did its promoters set out to build a network of slim gauge tracks over thousands of miles of desert, but they impudently organized to do it all with private financing without any government subsidy or land grant such as most other pioneer railroads had received. Most of the original D&RG capital was furnished by British, Dutch and German investors.

Events moved along quickly on the early Rio Grande and General Palmer was a very busy man. May 2, 1871, he formed the Colorado Springs Co. to build a city at the foot of Pikes Peak. January 1, 1872, saw his diminutive trains operating into the new town. By June 1 of the same year they were running into Pueblo and November 1 a branch was opened to Florence, 32½ miles west of Pueblo. Early in 1876 the slim gauge tracks reached El Moro, four miles northeast of Trinidad—and about that time complications arose.

The complications consisted of the surveyors, construction crews (and lawyers!) of the Santa Fe, sweeping down out of Kansas like the proverbial Kansas cyclone, and troubles piled up thick and fast for the Grande. Both the Santa Fe and Rio Grande were headed for Raton Pass and New Mexico and at the same time both were becoming increasingly aware of the opportunities that were opening up with the discovery of gold at many points in the Colorado mountains to be climaxed by rich strikes at Leadville in 1877. Typically, General Palmer at once decided that the nearby fabulous riches of the Cloud City were a much more practical objective than Mexico City or California and peaceably surrendered his claim to use of Raton


J.H.COLTON'S
COLORADO
AND
NEW MEXICO.
Scale of Miles
Raton Pass
Sierra de la Plata
Sierra Del Caballo
S Capitan
Sierra Blanca
Sierra Sacramento
Mesa de Estanqueda
Mountains
Yampah or Bear R.
Blue River
Yah-cow Pass
Frémonts Route
Pony Express Route
Cheyenne Indians
Reservation
Arapahoe
Douglas
Boulder
El Paso
Pueblo
Huerfano
Las Animas
Colfax
Mora
Taos
Rio Grande
Rio Pecos
Rio Puerco
Rio Chama
Rio Gila
Rio Colorado
Rio Grande
Rio Arkansas
Rio Cimarron
Rio Canadian
Rio Pecos
Rio Grande

Top, Wm. H. Jackson; below, Denver & Rio Grande Western.

How a railroad grows up is graphically illustrated in these two photos, one showing Castle Gate, Utah, in 1884, and the other the same scene today. The view is southeast down Price Canyon. The huge rock making up the side of the gate to the left is actually only a very thin natural rock wall.

Pass to the Santa Fe. The Santa Fe people, however, who had followed the Rio Grande into Pueblo with a branch completed March 1, 1876, apparently decided they wanted not only Raton Pass but the "gold in them thar hills," too. Early 1878 saw tension rapidly mounting to the explosion point as the opposing forces jockeyed for position and eyed each other for the first move toward the crucial bottleneck in the Royal Gorge.

Through the course of millions of years, sand-filled waters of the Arkansas had gradually sawed a narrow cleft, 11 miles long and more than 1100 feet deep, through the solid rock escarpment of the plateau towering above the edge of the plains at Canon City. Throughout its course of 116 miles from Canon City to the Leadville gold diggings, the Arkansas provided an easy water grade for a railroad. The Royal Gorge, only 30 feet wide in some places, provided barely room enough for one railroad alongside the erratic river; two were simply out of the question. Hence each side greatly coveted the gorge, not only as a route for its own tracks, but as a strategic means of keeping its rival from having any access at all to the mountain gold fields.

The Royal Gorge war, formally "declared" April 19, 1878, when both companies sent grading crews into the Gorge, is a classic chapter in railroad litigation. Before the final legal gun was fired and hostilities officially terminated in February, 1880, an amazing succession of legal seesawing rocked Colorado to its foundations. Under the most important terms of the peace treaty concluded as the smoke of judicial battle cleared away, the Santa Fe agreed not to build west of Canon City for 10 years. For the same period, the Rio Grande agreed not to build south of Raton Pass or Espanola, N. M., and also agreed to pay $1,400,000 for the partially constructed Santa Fe grade between the Royal Gorge and Leadville.

Echoes of the final salvo of writs of mandamus had scarcely died away before General Palmer's crews were hard at work driving a fanwise network of slim gauge tracks at incredible speed through the mountains, and 1880 was a very busy year on the "baby railroad." On July 20 the first train pulled into Leadville

Castle Rock, Colo., is a landmark on the line between Denver and Colorado Springs. The main line from Denver to Pueblo skirts the edge of the Rockies and displays a constantly changing panorama of the Rampart Range. Pikes Peak dominates the scene most of the way.

L. C. McClure.

amid great fanfare, highlighted by the presence aboard of ex-President U. S. Grant. The close of the year saw other slim tracks completed over Cumbres Pass to Chama, N. M., and down the Rio Grande to Espanola.

General Palmer was not only engaged in building a railroad. To a very large extent he also had to build a country to support it. With this necessity in mind, he organized, in 1871, the Colorado Coal & Iron Co. In 1880 he founded South Pueblo, later to be known for awhile as Bessemer, and commenced construction of steel mills to make use of coal from Trinidad and iron ore from Orient in the San Luis Valley. Rio Grande tracks had crossed the Sangre de Cristos through La Veta Pass from Walsenburg to Alamosa in July, 1878, while the Royal Gorge was still in escrow.

1881 was one of the most eventful years in the entire history of the Rio Grande. Slim gauge tracks, many of them laid with rails from General Palmer's new South Pueblo steel mills, were rapidly being pushed through to such distant points as Durango and Rockwood (on the Silverton branch), across Marshall Pass to Gunnison and Crested Butte and across Tennessee Pass to Red Cliff. In that year the Rio Grande ceased being exclusively narrow gauge. The laying of a third rail between Denver and Pueblo ushered in a colorful era that often saw the operation of mixed gauge trains.

The most important event of 1881, however, was the organization by General Palmer of the Rio Grande Western on July 21 for the purpose of building a narrow gauge railroad east from Salt Lake City to connect with the Denver & Rio Grande. Construction proceeded at typical Palmer speed. The 50-mile section to Springville was completed that same year. From there to Detour, 30 miles, an existing narrow gauge, the Utah & Pleasant Valley, was bought outright. Soldier Summit, reached by a four per cent grade along the bottom of a ravine ascending the slope of the Wasatch Plateau, was crossed early in 1882 and the D&RG building westward from Gunnison through the Black Canyon and Montrose reached Grand Junction December 19 of that year. RGW tracks crossed the Colorado line April 8, 1883, and joined the D&RG at Crevasse, Colorado, May 21. On the same day, the extension from Salt Lake City to Ogden was opened, forming a through narrow gauge main line 771.4 miles long from Denver to Ogden. After 12 years, the "baby railroad" really went somewhere.

Gould interests first appeared in the D&RG picture during the Royal Gorge war, when they acquired a half interest in the road. Following completion of the RGW, friction between the Goulds and General Palmer led to his resigning as president of the D&RG although retaining his control of the RGW. He was succeeded on the D&RG by Frederick Lovejoy, a Gould appointee.

The next seven years were anything but dull on the Rio Grande. Neat little diamond stacked Ten-Wheelers labored mightily shuttling luxurious trains of narrow gauge Pullmans between Denver and Ogden via Marshall Pass. Advertisements bearing the Curecanti Needle trademark successfully proclaimed far and wide the wonders of the "Scenic Line of the World."

For a very short time it appeared as if the narrow gauge might continue indefinitely in complete possession of its mountain empire. Then a large and sinister cloud appeared on the horizon, this time in the vicinity of Colorado Springs where a group of financiers met on November 23, 1883, and incorporated the Colorado Midland Railroad [May 1943 Trains] for the avowed purpose of building a standard gauge railroad directly through the mountains from Colorado Springs to Salt Lake City. It was obvious to the D&RG and RGW managements that something would have to be done quickly to meet this new threat so for the second time in its brief lifetime, the "baby railroad" pre-

Lucius Beebe, from his forthcoming book "Highball."

Four-unit freight Diesels now hoist freight up the Moffat Route west of Denver and across the Rockies through the Moffat Tunnel under James Peak. Once the Moffat Road had no through connections, but with the completion of the Dotsero Cutoff in 1934 it is now part of an important transcontinental route.

pared to undergo a complete metamorphosis, this time from narrow to standard gauge.

It was an enormous and expensive undertaking. Bridges had to be rebuilt. Heavier steel had to be laid. Curvature and gradients had to be reduced. Miles and miles of trackage had to be relocated and relaid with three rails instead of two. Standard gauge rolling stock and motive power had to be acquired. Shop facilities had to be enlarged and duplicated so as to cope with equipment of both gauges. And all the while, standard gauge steel of the Colorado Midland knifed deeper and deeper into the Rio Grande domain, first to Buena Vista and Leadville, and then to Aspen, Glenwood Springs and New Castle.

But the Midland began to run short of funds, and the Rio Grande wasn't exactly in a position to squander money uselessly. The narrow gauge main line, negotiating gradients of four per cent and maximum curvature of 25 degrees 30 minutes over 10,856-foot Marshall Pass, was not suitable for conversion to standard gauge and the Rio Grande planned on running its new main line over a route 24 miles longer via Tennessee Pass and Glenwood Springs. Rather than waste money by building two parallel tracks between Grand Junction and New Castle, the Midland and Grande got together and arranged to build a joint track which was completed in September, 1889.

Completion of the Rio Grande's Tennessee Pass tunnel November 14, 1890, opened the standard gauge route from Denver to Ogden.

The third metamorphosis of the Rio Grande was not as spectacular as the first two, but was equally important and brought about profound changes in the railroad's operating problems. This was the changeover from the role of an

almost exclusively local carrier to that of a bridge carrier. To illustrate this point, we shall need recourse to a few statistics. Scrutinizing tonnage records in this respect, as divided into local traffic (entire movement between two Rio Grande points only), interchange traffic (moving to or from a Rio Grande station in connection with one or more connecting carriers), and overhead traffic (in which the Rio Grande is merely an intermediate carrier), we find the following breakdown:

Year	Local	Interchange	Overhead
1910	70%	28%	2%
1940	34%	41%	25%

This changeover was not brought about on purpose, by any means. Long haul interline traffic is far less profitable than local traffic for the simple reason that the revenue per ton-mile is much lower. It was merely a case of the Rio Grande making the best of a bad situation. When the sources of local traffic began to dry up, the railroad had to reach for something else.

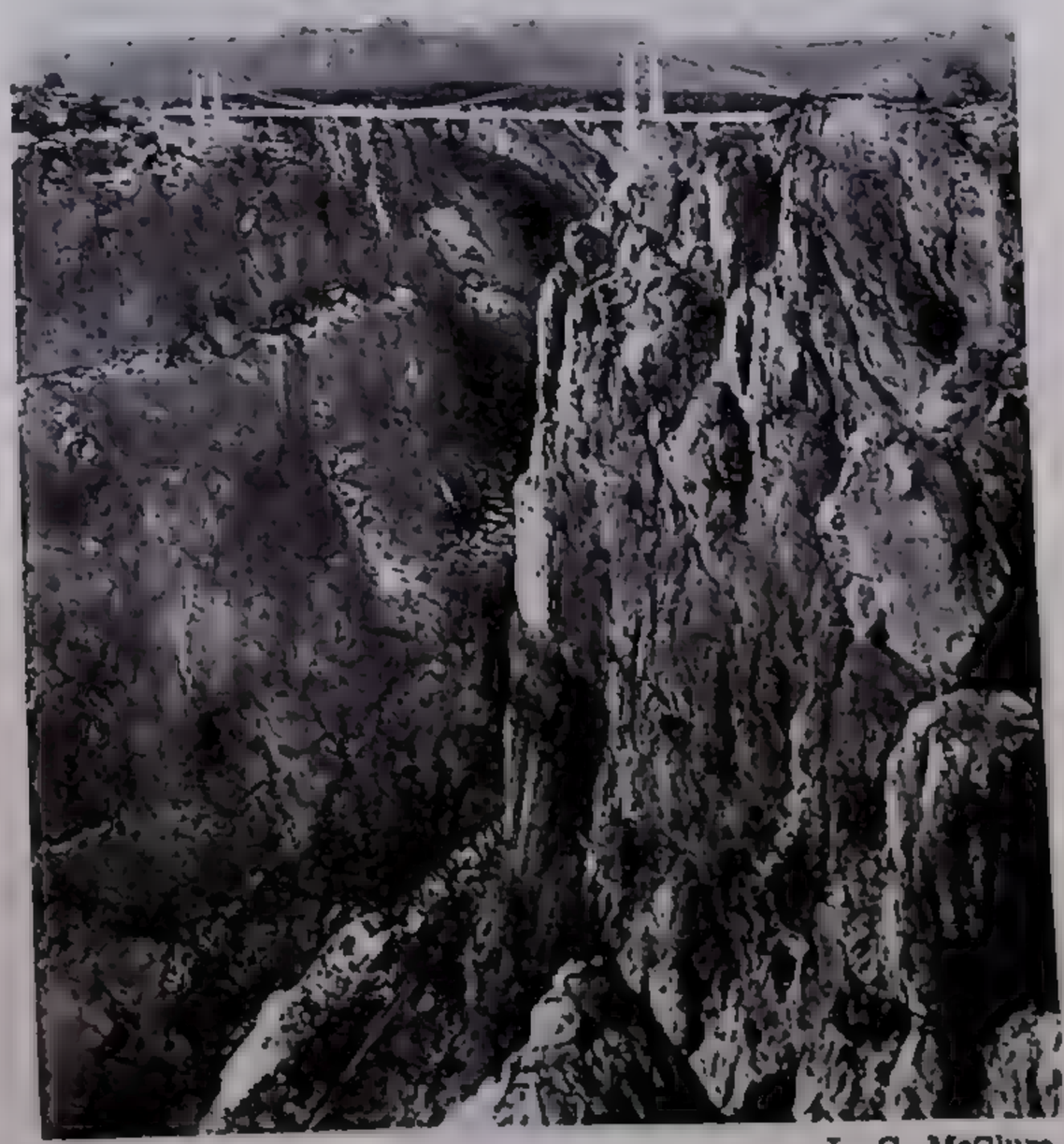
In the early days, upon completion of the pioneer railroads, the Colorado and Utah mountains became sources of huge amounts of local traffic. A saw mill was set up in almost every wooded valley. Mines of all types, principally producers of coal and precious metals, flourished everywhere. Mining and smelting methods employed in those days required hauling immense quantities of ore to distant smelters for treatment. Almost endless trainloads of coal were required as fuel in important growing population centers like Denver, Salt Lake City, Pueblo and Colorado Springs. In 1885, 32 per cent of the total tonnage hauled by the Rio Grande was ore on its way to smelters. By 1911 this figure had risen to 54 per cent. Then the ore traffic did a nose dive due to several complicated reasons. Timber traffic also began to suffer. Many of the best timber producing areas had become exhausted. Finally coal traffic languished, largely due to introduction of natural gas and fuel oil in many important markets. Only a few old reliable sources of local traffic remained in good shape, such as farm products, livestock and most of the Utah copper.

The Rio Grande had one important asset to fall back on when all this happened. Thanks to General Palmer's energy and foresight, it really went somewhere. While purely local mountain railroads such as the Colorado Midland and the South Park were withering away, the Grande was steadily developing overhead business in connection with the Rock Island, Missouri Pacific, Santa Fe and C&S at Pueblo and with western carriers at Salt Lake City and Ogden.

In 1901, the Goulds enlarged their holdings in the D&RG, giving them complete control. At the same time, they bought General Palmer's controlling interest in the RGW, finally uniting the two roads to form the Denver & Rio Grande Western in 1908. Meanwhile, in 1902, a consolidation of the Harriman lines, at that time including the UP, SP and OSL, left the Grande with no friendly connection at Salt Lake City except the LA&SL, then known as the "Clark Road." Thereupon the Goulds, between 1905 and 1911, constructed the Western Pacific [March 1942 TRAINS]. This formed an independent outlet for the Grande to San Francisco Bay and assured its permanent position as a transcontinental carrier, but the fantastic financial arrangements, rigged in typical Gould fashion, whereby the Rio Grande underwrote $38,000,000 worth of Western Pacific bonds, doomed the Grande's hopes of financial solvency as long as they were in force.

ONE of the most important developments in Rio Grande history was the opening on June 15, 1934, of the Dotsero Cutoff, 38 miles in length, between Dotsero on the Gorge route and Orestod on the Denver & Salt Lake. This makes

Looking more than 1100 feet down into Royal Gorge.



L. C. McClure.

Lee, courtesy Farm Security Administration.

Linn H. Westcott.

the Grande the shortest route between Denver and Salt Lake City and provides a direct west coast outlet for the Rock Island and Burlington through the Denver gateway. The cutoff has by no means replaced the Gorge route, or even reduced its importance. On the contrary, traffic through the Pueblo gateway has shown a steady and consistent increase ever since opening of the cutoff and still continues to handle the larger share of freight traffic.

Heavy expenditures of the cutoff construction, accumulated deficits of the depression years, and as always, the far-reaching hands of the gone-but-not-forgotten Goulds, culminated in 1935 by throwing the Grande into reorganization. November 18 of that year the federal court at Denver appointed as trustees Wilson McCarthy, an eminent Salt Lake City jurist, and Henry Swan, a prominent Denver financier. They have proven to be a splendidly balanced team for this task, with keen insight into problems of organization, operation and finance. Their trusteeship has been marked by many important improvements. The present day Rio Grande is a vastly different railroad from the one they took over.

During the eight years 1936-43, inclusive, a sum of over $44,000,000 has been spent improving the railroad. Every detail received attention in this program which was calculated to place the Rio Grande on a footing second to none. New equipment purchases include 26 steam locomotives of the 4-8-4, 4-6-6-4 and 2-8-8-2 types, 3600 assorted pieces of freight rolling stock, 35 Diesel-electric switchers and 11 5400-horsepower four-unit Diesel freight locomotives. The Diesel locos, costing a cool half million apiece, are used exclusively in freight service over the Moffat Tunnel route (Dotsero cutoff).

During the same period, 773 track miles of rail were relaid with heavier steel and 2,822,897 ties were replaced. In addition, 136 bridges were eliminated by fills or steel culverts and 1389 were repaired, built or rebuilt. Practically all bridges have been converted to ballast deck type. Large sums have been spent on passenger rolling stock and improvements to shops, buildings, communications and yard facilities.

These and earlier improvements have brought about some significant revisions in operating statistics. In the period 1920-43, gross ton-miles per train-hour increased from 10,833 to 29,747.

Prior to World War I, the Rio Grande and Santa Fe each used its own single track between Denver and Pueblo, crossing over each other four times in 119.4 miles. Under pressure of wartime necessity a paired track arrangement was set up that is still in use between South Denver and Bragdon. Overpasses at Sedalia, Spruce and Fountain were torn out and the right and left hand tracks joined up at grade throughout. Southbound Rio Grande, Santa Fe and C&S trains all use Rio Grande steel from South Denver to Sedalia, Santa Fe from Sedalia to Spruce, Rio Grande from Spruce to Fountain and finally Santa Fe from Fountain to Bragdon. Southbound trains of all three roads are dispatched by the Rio Grande dispatcher in Pueblo, under Santa Fe rules, while the Santa Fe dispatches all northbound trains.

This track performs the interesting feat of bringing an "eastbound" train into Denver

A. Howard Christianson, c/o C&EI, Miami, Fla.

Most Rio Grande stations are set amid mountain scenery. Montrose, far left, is at end of standard gauge on the old narrow gauge line over Marshall Pass. Its station tracks have three rails to accommodate equipment of either gauge. Salida station is surrounded by yards in which many tracks are three-rail and narrow gauge equipment is prominent. Travelers on the main line down the Colorado River usually remember the parklike station grounds at Glenwood Springs, where the Scenic Limited is shown making a rainy day stop.

from St. Louis. The train that finds itself in this Abbot and Costello predicament is the *Colorado Eagle,* a jointly owned RG-MP Diesel-electric streamliner which leaves St. Louis as MP No. 11. At Pueblo it becomes D&RGW No. 4. All Rio Grande operation from Pueblo to Denver is considered eastbound.

THE Gorge route has one for Ripley. Much of its track is ballasted with gold. That's right. Slag from various old smelters along the route, with a gold content worth about $1000 per mile if you can figure out some way to extract it.

The Denver-Pueblo subdivision isn't exactly straight or level, having a ruling gradient of 1.42 per cent between Castle Rock and Palmer Lake, westbound. Maximum curvature reaches six degrees westbound and seven degrees 30 minutes eastbound and 40.1 miles, or 34.6 per cent of the subdivision, are curved. Incidentally, the *Colorado Eagle* does quite well on this piece of track, making the 119.4 miles in 2½ hours.

The swift flowing Arkansas creates an exaggerated impression of the ruling grade in the Royal Gorge, which actually is only 1.41 per cent. As to curvature, that's a different story. To the layman, it's just plain crooked, but in case you're interested in figures, here they are. Maximum curvature in the gorge is 12 degrees 30 minutes. Here 46.4 miles, or 49.8 per cent of the Pueblo-Salida subdivision, are curved.

The next 86.9 miles from Salida to Minturn take the Gorge Route through a total of 6700 degrees of curvature, up 3197 feet to the tunnel apex in Tennessee Pass and then down 2422 feet in 21 miles of double track with a ruling gradient of three per cent. Naturally the Tennessee Pass-Minturn section carries a heavy movement of helper engines.

The Tennessee Pass tunnel is 2576 feet long and bores on an eastward ascending grade to an apex at 10,242 feet near the east portal. It eliminated a long stretch of four per cent grade that carried the original narrow gauge over the top at an elevation of 10,424 feet prior to 1890. This tunnel creates a serious bottleneck in the Gorge route, being only 17 feet 10 inches high and 14 feet wide. A new tunnel, 2550 feet long, concrete lined throughout, and 23 by 16 feet in cross section is now in course of construction

Optional routes

Each month TRAINS prints a brief survey of available routes between two larger cities.

Cincinnati and Chicago:

New York Central—Most frequent service. Six trains each way daily except for one Monday morning curtailment. *James Whitecomb Riley,* streamlined reserved coach train with solarium, makes a round trip. Three conventional daytime trains each way. Also overnight service with sleepers. Via Indianapolis, with local sleeper between that point and Chicago.

Pennsylvania Railroad—Four daily trains each way. Sleeper service on overnight train. Via Richmond, Ind., and Logansport, except trains carrying sleepers; the latter operate via Richmond and Ft. Wayne.

Chesapeake & Ohio—One weekday daytime train each way between Cincinnati and Hammond; journey between Hammond and Chicago via Nickel Plate, Erie, or Monon, and southbound via South Shore Line.

Richard H. Kindig, Denver, Colo.

Rio Grande locomotive No. 3704, a 4-6-6-4 simple articulated, pulls out of Helper, Utah, with the second section of No. 34, 61 cars. Soldier Summit, 7440 feet, is behind and the grade is prevailingly down across the valley of the Green River and into the Colorado Valley.

from a point 75 feet south of the old tunnel at the east portal to a point 100 feet south of it at the west portal.

The three per cent eastward ascending ruling gradient encountered between Minturn and Tennessee Pass is the steepest section of track in either direction on the Gorge Route. The eastbound *Scenic* is usually helped out of Minturn by a 2-8-8-2 in front of its regular 4-8-4.

West of Minturn the railroad encounters less difficult terrain. Long tangents, easy curvature and light grades prevail most of the way to Price, Utah, permitting high average speeds. Soon after leaving Grand Junction the Grande enters a desert country, spread out for more than 125 miles along the base of the Book Plateau, a high flat-topped escarpment capped with sandstone, eroded in grotesque formations and scarred by deep, rocky canyons. Near Green River, Utah, is the lowest point on the Rio Grande system, elevation 4066 feet.

The most important job of mainline relocation since completion of the standard gauge in 1890 took place in Utah. The old eastward ascending four per cent gradient from Detour to Soldier Summit created an operating problem of the first magnitude. As early as 1897 it was double tracked to facilitate movements of large numbers of helper engines. In 1912 construction was commenced on a new double track route, about four miles longer, comprising a big three rung "ladder" with two horseshoe curves of maximum curvature of nine degrees and ruling gradient of two per cent. The steepest westward ascending gradient on the Gorge Route, 2.4 per cent, occurs east of Soldier Summit in Price Canon between helper and Kyune, with maximum curvature of nine degrees.

The Rio Grande is not the biggest railroad in the country, but it isn't small, either, ranking twenty-fourth in American railroads in respect to mileage of track as of February, 1944. Mile for mile, its track and equipment now compares very favorably with that of much larger roads. As of January 1, 1944, it owned 426 steam locomotives, 168 units of passenger rolling stock, 15,401 freight cars and 966 assorted units of nonrevenue equipment. According to 1940 census figures, it serves 72.8 per cent of the population of Colorado and 76.6 per cent of the people of Utah. It operates 36 per cent of Colorado's railroad mileage and 34 per cent of Utah's. Rio Grande owned and operated mileage of track is made up of 1815 miles of standard gauge, 607 miles of narrow gauge and 48 miles laid with three rails. Trackage rights over the D&SL between Utah Junction, two miles north of Denver, and Orestod account for 127 miles of mainline mileage while 87 miles are added to branch line mileage in the Walsenburg-Trinidad coal field area by trackage rights, principally over the C&S.

In addition to the paired track arrangement with the Santa Fe between South Denver and Bragdon, 60.9 miles between Pueblo and Walsenburg are operated under a somewhat similar arrangement with the C&S. The original Rio Grande single track between those points was badly damaged by floods in 1911 so it was dismantled and relaid on the C&S roadbed, thereby providing a double track for both roads. In Utah another paired track deal with the Utah Railway Co. from Provo to Thistle accounts for 20.3 miles of 74.7 miles of double track between Helper and Provo.

Approximately one third of the Gorge Route from Denver to Salt Lake City, 253 miles, is double tracked. The 317.9 miles of single track between Dotsero and Salt Lake City which carries both Gorge Route and Moffat Tunnel traffic has been equipped with centralized traffic control, installed at a cost of $10,000 per mile. Most of the single track on the Moffat line, Denver to Dotsero, was similarly equipped last year.

The Grande has carried out extensive experiments with use of radio communication between trains, between caboose and engine and between trains and stations. Results have been highly satisfactory. Passing signals when two or three tunnels and a sizeable chunk of mountain intervene between engine and caboose has always been a major problem in mountain railroading.

The Rio Grande system is divided into four divisions, taking their names from divisional headquarters. The Pueblo Division extends westward to, but does not include, Salida and Alamosa. It also conducts Rio Grande operations over the D&SL as far as, but not including, Bond. The Grand Junction Division includes Salida, Bond and Montrose and extends westward to, but does not include, Helper, Utah. Helper and all trackage west of there make up the Salt Lake Division. The "Ala-moosa" Division includes Alamosa and embraces all narrow gauge lines, including the old main line Salida to Montrose through Gunnison. With the exception of the 70-mile Alamosa-Creede stand-

L. C. McClure.

ard gauge branch and 48 miles of three-rail trackage Antonito to Hooper this division is all narrow gauge.

Many passenger trains make a portion of their daily runs over parts of the Gorge Route, although the only one to traverse its full length is the *Scenic Limited,* whose 25 hour, 5 minute journey we have already followed from Denver to Ogden. The *Scenic* manages to accommodate a lot of passengers in its long trip around the horse shoe. Quite a few of them are purely local, only riding a few miles, but the majority are interline, picked up at main terminals from connecting carriers. Many travelers enjoy going via one Rio Grande route and returning via the other.

The Denver-Pueblo joint track is a very busy railroad, carrying 14 scheduled passenger trains daily, including the streamlined *Eagle* and *Texas Zephyr.* There was a time when the Rio Grande's No. 15 went through the Gorge and all the way to Grand Junction, but times changed and now 15 goes to Pueblo, sets out a mail and express car for a time freight to take to Salida, and then goes on to Alamosa as No. 115, which is an interesting number, belonging also to the amazing punctual "little one" [September 1944 TRAINS] plying daily between Alamosa and Durango. (If your watch doesn't say exactly 4:04 p.m. when No. 115's narrow gauge whistle shreiks for the yards in Durango, you'd better get your watch fixed.)

Getting back to the Gorge Route. West of Dotsero, passenger traffic picks up considerably with the addition, via the cutoff, of the Chicago-San Francisco *Exposition Flyer,* in two sections and the *Mountaineer,* a comfortable overnigh local train from Denver to Montrose.

The three principal Rio Grande yards are a joint operations with other roads. The larges Salt Lake-Roper Yard, is conducted jointly wit the Western Pacific. Roper Yard engines an crews also handle the Midvale Yard and large volume of interchange traffic for near smelters. The second largest yard, that Pueblo, is joint with the Missouri Pacific a

Otto C. Perry, 74 Elati St., Denver, Colo.

Ruby Canyon (left) is toward the west end of the Rio Grande's more than 100 mile run through the canyons and valleys of the Colorado. The photo was taken years ago for advertising purposes. The freight train above is approaching the east portal of Tennessee Pass tunnel. The old tunnel here is now being supplemented by a new and larger bore.

is in charge of a terminal trainmaster who has charge of yards, shops and Pueblo Union Depot. The depot is also used by the Santa Fe and C&S. In normally busy times, 20 to 25 switch engines are at work in the Pueblo yards. The third largest yard, at Denver, is joint with the Rock Island, but is operated entirely by Rio Grande engines and crews who also perform all switching for the Wazee Market. Normally busy times require 18 to 20 switch engines in Denver. Under abnormal wartime conditions, everything that can hold steam and turn a wheel still isn't quite enough, but an excellent performance record is hung up anyway at all the main terminals.

Most important of all strictly intermediate yards is at Grand Junction, where eastbound trains are split as necessary and made up for routing via Denver or Pueblo. Grand Junction is a very busy place during the peach shipping season and heavy tonnage of coal and livestock off the Montrose branch and its standard and narrow gauge appendages is classified there.

Three lesser yards, at Alamosa, Salida and Montrose, are of interest because of their dual gauge. All their tracks and industrial sidings are three rail. Switching is usually handled by standard gauge engines but sometimes a valiant little narrow gauge can be seen manhandling heavy cuts of standard gauge loads in yard service. Standard gauge steam switch engines at these points are equipped with a steam powered device, controlled from the cab, that shifts the couplers diagonally to a lower off center position to line up with narrow gauge couplers. Diesel switchers are equipped with two fixed couplers in the required positions on each end. Interchange facilities at Salida include a barrel transfer that nonchalantly picks up narrow gauge gondolas and dumps their contents into half their number of standard gauge gons.

The Rio Grande attains the utmost in spectacular mountain railroading in magnificent displays of perfectly functioning steam power working at its utmost capacity in the depths of the Eagle River Canyon. You can visualize the scene and time, perhaps. A bitter cold clear night in the dead of winter, one of those nights when the air is so still the bark of a dog can be heard from miles down the canyon. Suddenly the stillness is broken by the distant

shriek of a locomotive whistle, softened by intervening twists of canyon walls. Echoes of the whistle die away to be followed by a faint rumble along the rails, slowly mounting to a roar, telling of the rapid approach of three monstrous 2-8-8-2's completely lifting their long heavy train up to Tennessee Pass.

The roar grows louder, occasionally muffled as the engines successively pass through tunnels. Then a louder metallic roar as the train crosses a steel bridge. For a few seconds the exhaust blasts are in perfect unison, smiting the canyon walls in thunderous fury until it seems that if any man-made disturbance can shake the lofty crags from their foundations, this must be it. Then the slip of a set of drivers breaks the rhythm and the blasts merge again into a continuous roar growing louder and louder as the headlight sweeping around reverse curves lights up one precipice after an-

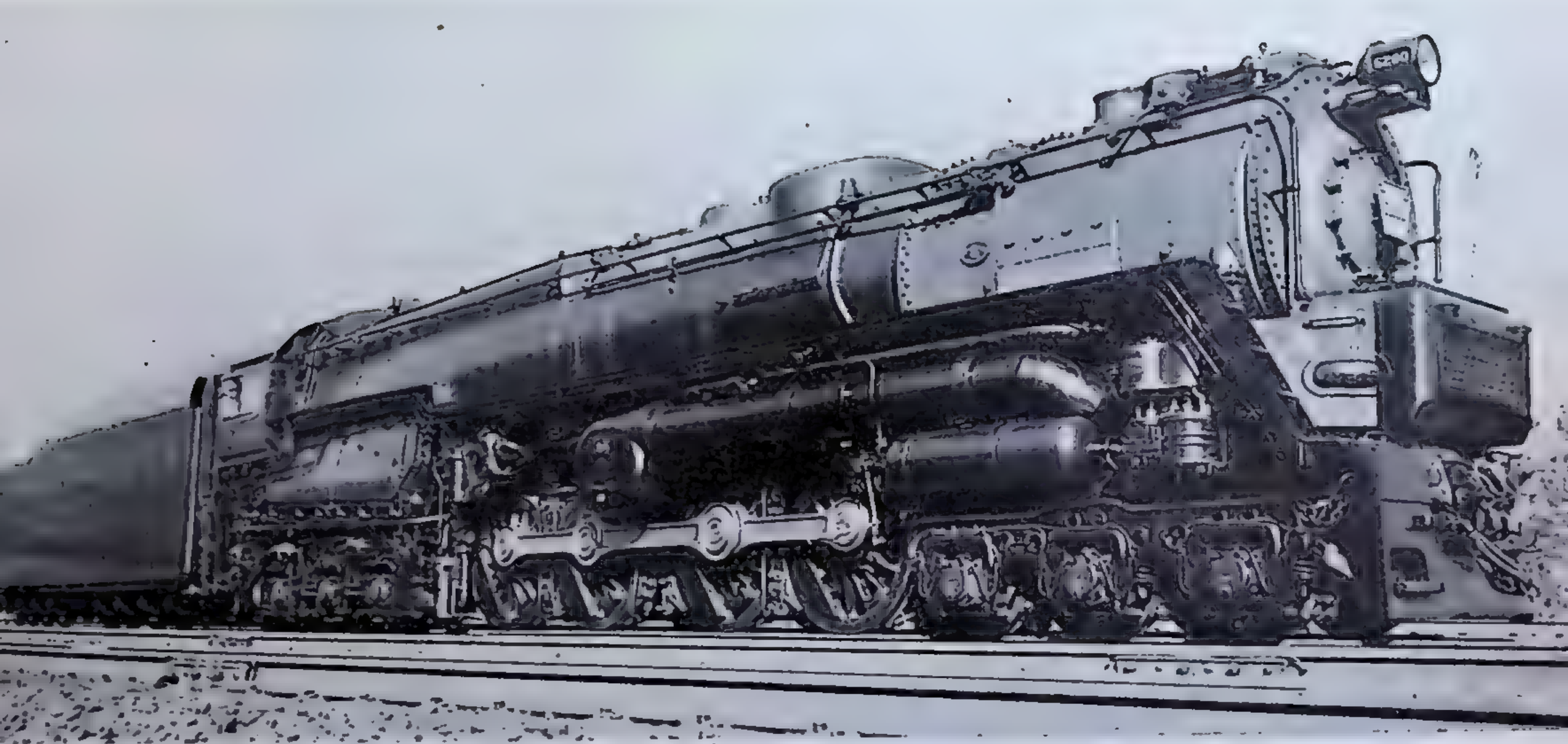
Otto P

other. In swift succession the laboring giants shake the earth as they thunder past the observer. There is a brilliant flash as a firebox door is opened; sparks dropping into ashpits; the rattle and clank of brake gear and rail joints; the squeal of flanges on curves of cold steel. Then two marker lights fading away around a curve of the canyon and it is gone.

There'll be another one along shortly. It's all in the day's work on the Rio Grande.

On the Narrow Gauge

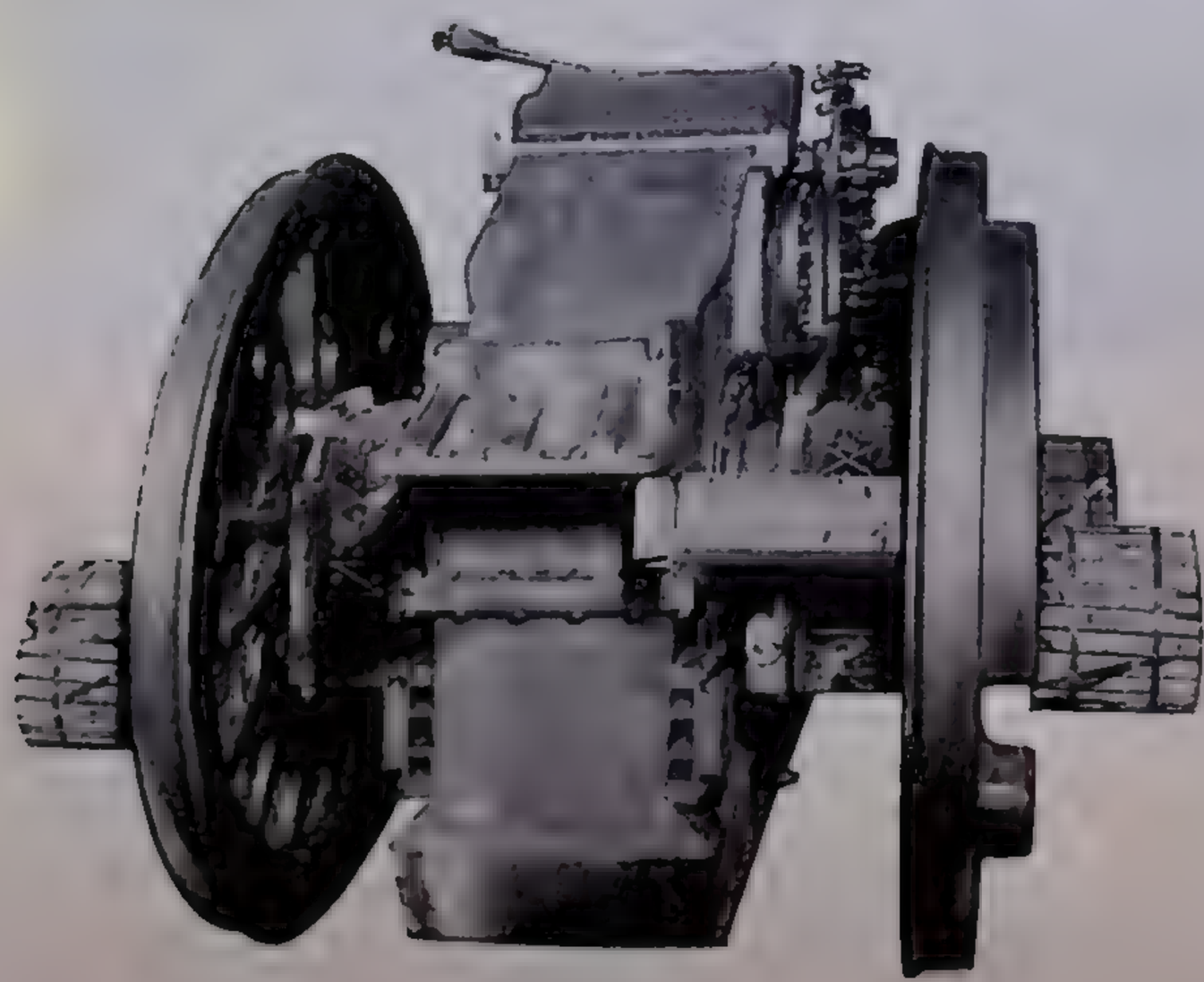
A typical narrow gauge freight train crosses the plains in the San Luis Valley on the route between Salida and Alamosa. This line, which goes by Sand Dune National Monument and several hot springs, has the longest stretch of straight track on the Rio Grande, 53 miles. This level valley nestles between the Continental Divide and the Sangre de Christo Mountains. The locomotives are heavy outside frame Mikados of 37,100 pounds tractive effort, built in the road's shops.



Illustrations from Baldwin, Westinghouse, and Pennsylvania Railroad.

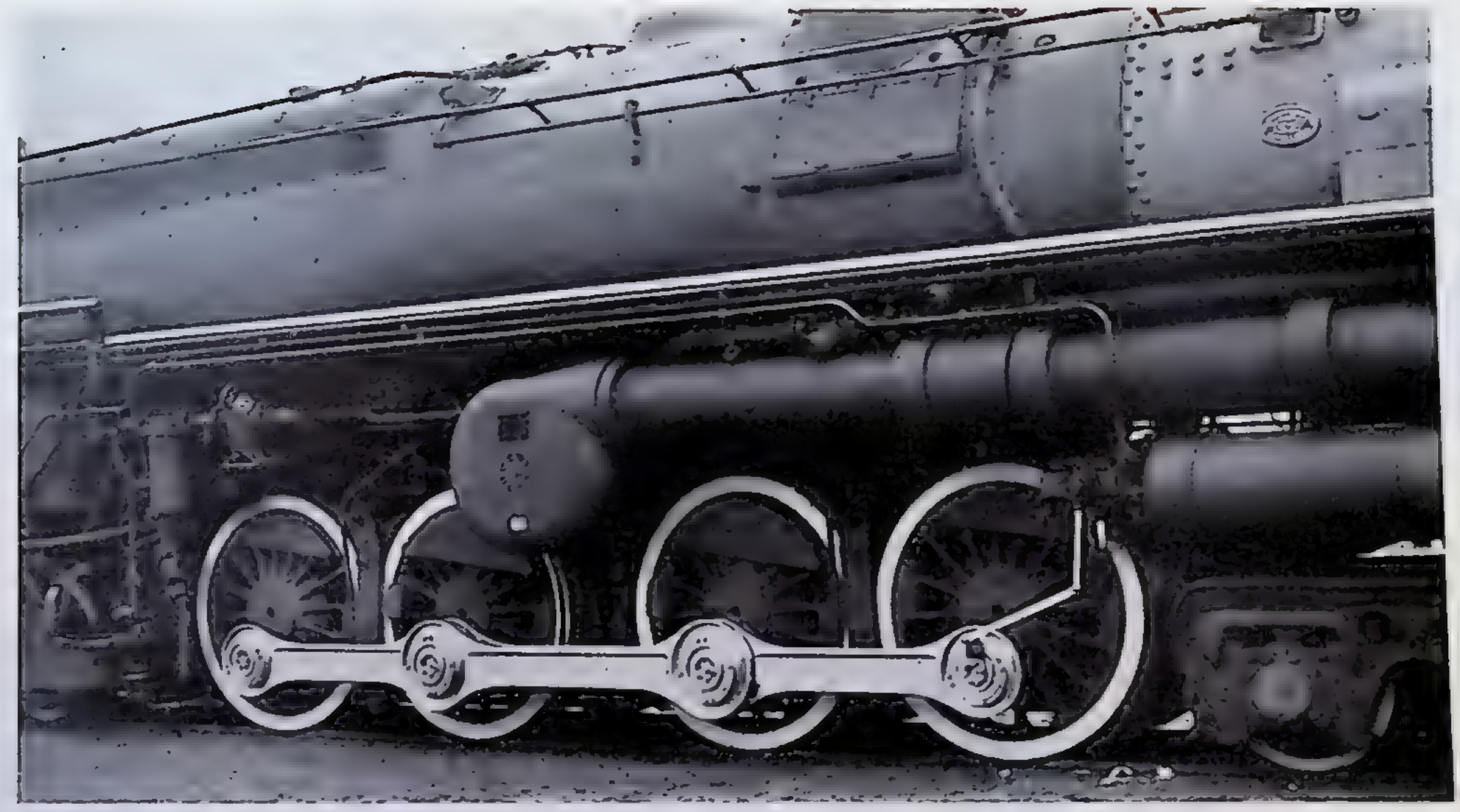
Driving Gear for Turbine Locomotives

Pennsylvania Railroad's experimental unit has uniform torque, fully balanced drive wheels, high efficiency at speed



THE question most frequently asked about the Pennsylvania Railroad's experimental direct drive steam turbine locomotive is, "How can a directly geared turbine start under load?" A common misapprehension is that the locomotive must have some sort of hydraulic transmission to vary the ratio between turbine and drive wheels. While the turbine is thought of as a wheel driven only by the high velocity of steam, it is instead a highly efficient means of transforming pressure and heat into torque and it can and does start a load without a variable speed transmission of any sort.

The gear ratio of the Pennsylvania locomotive, which was briefly described and illustrated in the January TRAINS, is 18.5:1 so that even at slow driving wheel speeds the turbine has a considerable rotative speed. The turbine is somewhat overbladed to increase its efficiency in starting under load and is in other ways designed especially to meet the severe temperature and load changes found in railway service. Even then it is not as efficient in the use of steam at slow speeds as is the conventional reciprocating engine, for the reciprocating engine has a certain degree of gear shift in its variable valve cutoff. But at high speeds the turbine is as much as 20 per cent more efficient in its



use of steam. This particular locomotive is designed for high speed service, but with different gear ratio and turbine design the direct drive principle could be applied equally well for slower speeds.

In starting a train the turbine locomotive has the advantage of constant torque in all positions of the drive wheels and thus exerts more tractive effort with the same weight on drivers. It moves off smoothly and with a constant rush of steam out of the exhaust instead of with the familiar chugs. At high speed the tractive effort is limited, just as with reciprocating locomotives, by the steam generating capacity of the boiler, but because of the turbine's greater efficiency the same boiler is able to apply more horsepower at the rail. Furthermore, because of the absence of reciprocating parts the side rods can be fully balanced and small drive wheels (in this case 68 inch) can be used, allowing a lower boiler and hence a bigger boiler diameter and larger grate. This gives the boiler designer greater leeway in fitting an efficient steam generator into limited railroad clearances. The method of drive also allows more freedom in wheel arrangement, and both these features are taken advantage of in the Pennsylvania's

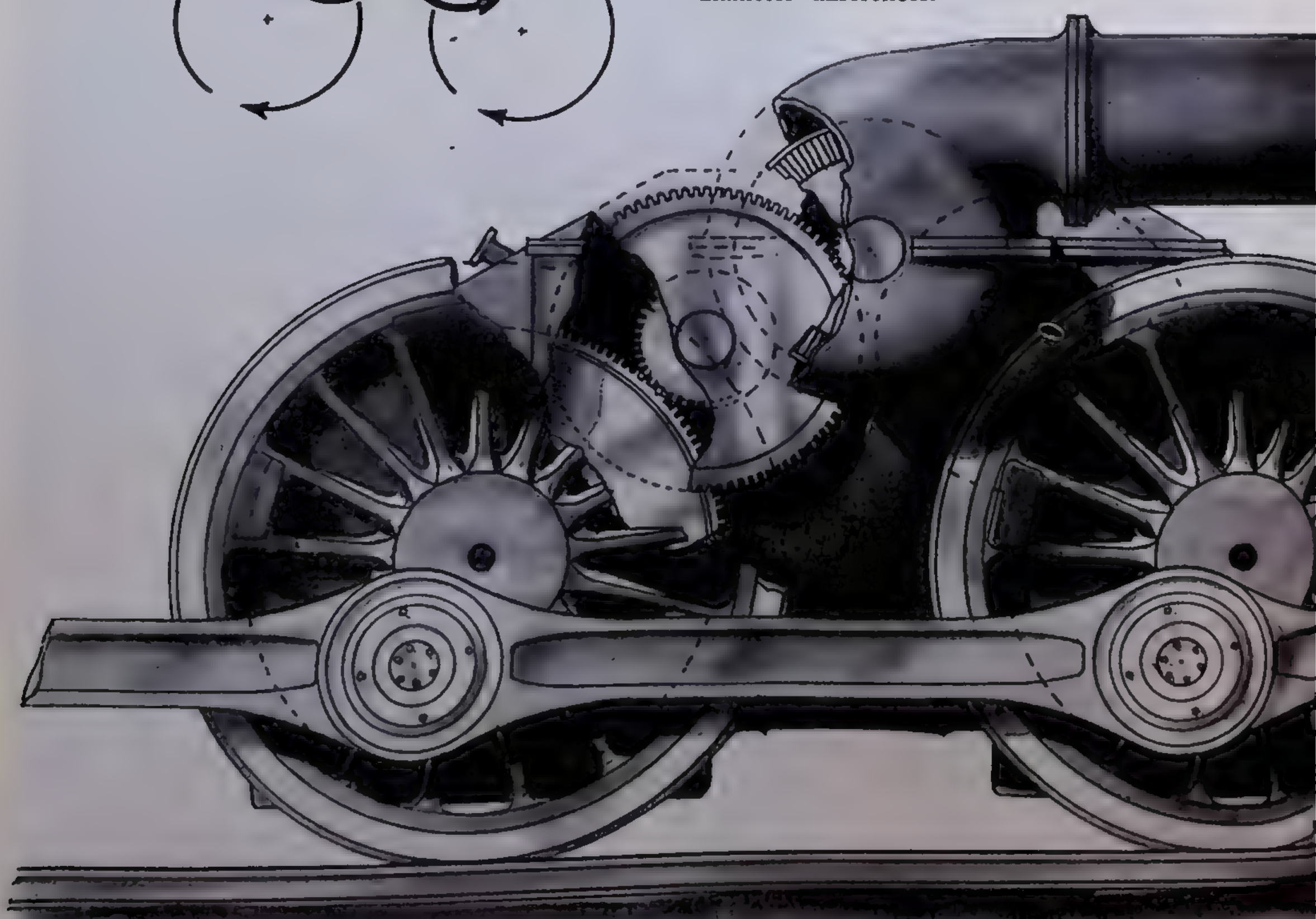
second turbine design, the proposed "triplex" which was illustrated on page 5 of last month's TRAINS.

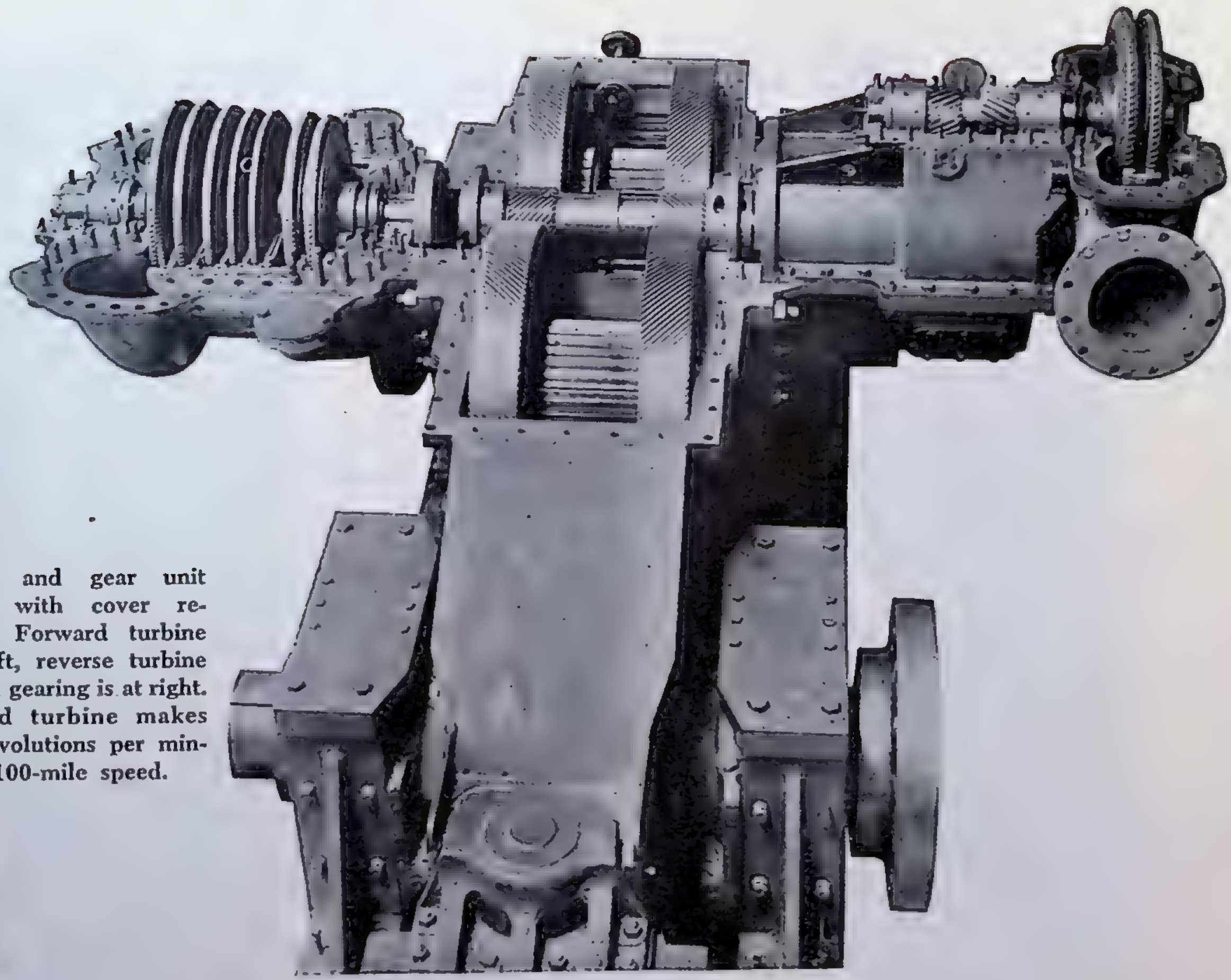
It was 1937 when the Pennsylvania Railroad engineering department became interested in improving the performance of its passenger locomotives by replacing the reciprocating engine with a turbine. Engineers of Westinghouse Electric & Manufacturing Co., maker of the turbines in the present engine, worked with the railroad and Baldwin Locomotive Works, builder of the locomotive, and designs for a 4-8-4 turbine locomotive were finished in 1941. To eliminate war-critical materials, the design was changed to a 6-8-6 before actual building. The locomotive was delivered late last year and has been in test service since.

Our photographs and drawing give a much better idea of the mounting and gearing than can words. Two turbines are used, a 6900 horsepower unit for forward motion and a 1500 horsepower unit for reverse motion. To give approximately the same tractive effort in reverse the extra gear for reverse motion is 4:1. This in turn limits the backward speed to about 22 miles per hour. The forward turbine is always in gear, but the backup unit is put in gear only when used. Power from the reverse turbine is transmitted to the main gear high speed pinion through a hydraulically actuated, positive engagement clutch. Engagement or disengagement of the clutch when the locomotive is moving is prevented by a zero speed interlock in the pneumatic control circuit which also controls the front end multiple throttle valves. This control circuit was made by the Westinghouse Air Brake Co. and is so built that a single small lever in the cab is sufficient to control the locomotive either forward or backward.

The gearing is in two reductions, the first being through two parallel sets of ground tooth heli-

The relative directions of the various reduction gears are indicated in the drawing below. The big steam pipe is for exhaust steam. Live steam is admitted through four three-inch pipes at 285 pounds pressure and is exhausted at 15 pounds pressure. Side rods are needed between center two pairs of drivers to equalize strain on gear teeth in case of slight driver diameter differences.





Turbine and gear unit (above) with cover removed. Forward turbine is at left, reverse turbine with 4:1 gearing is at right. Forward turbine makes 9000 revolutions per minute at 100-mile speed.

cal gears. The low speed gearing consists of two spur pinions and two low speed spur gears. This gearing together with two cup drive elements to connect the spur gears to the axles is all mounted in an enclosed fabricated steel gear case and is lubricated by oil circulated by small turbo-pumps.

Since this complete propulsion unit is supported from the spring-borne locomotive frame, the second and third driving axles must be permitted to move up and down with respect to the low speed gears which surround them. This vertical motion of each driven axle must take place while it is turned by its gear. The "cup drive" which permits this motion is really a misalignment coupling between the low speed gear and the locomotive axle. This same principle is used on most main-line electric locomotives, and is known as a quill drive.

The Pennsylvania S-2 has a locomotive weight of 152 pounds per rail horsepower as compared with 200 pounds for a Diesel of 6000 horsepower. The Diesel, because of its electrical transmission, has a much higher starting tractive effort, but suffers in capacity at high speeds. The turbine locomotive has the advantage of operating on either coal or oil fuel.

With the tendency toward light-weight rolling stock, many have questioned the wisdom of large capacity locomotives. An essential of high schedule speeds, both in freight and passenger service, is not only the ability of the locomotive to maintain these high speeds on level track, but also to maintain speeds on adverse grades and to rapidly accelerate from station stops and slowdowns. Thus the usefulness of the high capacity locomotive continues, with less emphasis on just starting tractive effort and more emphasis on high tractive effort over the entire speed range, in other words, high horsepower.

Class A.

Built in Roanoke

SINCE before the first World War Norfolk & Western has been building most of its locomotives at its Roanoke shops. A few well-engineered designs are used, and locomotives may be built to one design, like the Y-6 2-8-8-2 compound Mallet, for a number of years. This gradual replacement of old motive power with new keeps the roster quite well balanced at all times and no doubt also allows more efficient operation of the locomotive building departments at Roanoke.

Classiest looking locomotives turned out at Roanoke are the five Class J streamlined 4-8-4's, Nos. 600 to 604, built in 1941 when the N&W started pulling Southern streamliners between Lynchburg and Bristol. N&W also runs these engines on the *Pocahontas* and the *Cavalier*.

The Class A simple articulated engines numbered from 1200 to 1219 are used on both heavy passenger and freight trains. The first ten were built in 1936 and 1937; the last ten in 1943. They are identical except for a very minor difference in flue length which creates an 11 square foot difference in heating surface, and for a casing applied over the sander valves on the later engines. All are roller bearing equipped on all engine and tender axles.

Principle Dimensions:

	Class A	Class J
Tractive effort, lbs.	114,000	73,300*
Cylinders, diameter and stroke, in.	24 x 30	27 x 32
Drivers, diameter, in.	70	70
Weight on drivers, lbs.	432,350	288,000
Total engine weight, lbs.	573,000	494,000
Loaded tender weight, lbs.	378,600	378,600
Steam pressure, lbs. per sq. in.	300	275
Grate area, sq. ft.	122	107.7
Evap. heating surface, sq. ft.	6,639	5,271

Tender capacity, both classes: 22,000 gallons water, 26 tons coal.

* With booster, 85,800 lbs.

Class J.

Railroad Ticket Man

What does the passenger look like to the man on the other side of the ticket window?

BY WILLIAM FORSYTHE

THE man who sells the tickets is "half the railroad." Most passengers buy their tickets from him, rather than through the passenger traffic representative, and thereafter their only other railroad contact is with the conductor. All people travel, and these days most of them go by rail. How the ticket man handles them determines the line's goodwill. Goodwill, in turn, may mean profitable operation; its absence, deficits.

The ticket seller's duties are indicated by his title. He sells railroad and Pullman tickets, issues prepaid orders, accepts conductors' remittances, and in the smaller offices or stations he performs other duties best described as miscellaneous. He works in a ticket office which may be located at a station or terminal, or in a centrally located downtown office building, usually on the ground floor. He may work for one carrier or for two or more, or for a station company acting as agent for all its occupant lines.

In a small town, one man may be ticket agent and freight agent as well. He makes his own bank deposits. In a large office, collections are turned over to the office cashier. Balancing of accounts, in either instance, is a process as exacting as bank bookkeeping.

At least one record is kept of every transaction for accounting purposes and as a basis for possible later correction. For the auditor, sales are periodically totaled on printed forms that must balance against bank or cashier deposits. For passenger traffic headquarters, records are kept to show date of each ticket's issue, its class, destination, route, and amount collected. Such information is needed when tickets are lost or stolen, turned in for refund or exchange.

The ticket man's pay is comparatively low. In the larger cities, where living costs are higher than in small towns, present monthly income may reach $200, based on an hourly, daily or monthly rate. A ticket agent in charge of an office may get up to $300, but such jobs are few.

Rate of pay is not the only consideration; ticket men have additional rewards. They like the work, its regularity, free railroad transportation and railroad retirement income. There is the very real romance connected with all railroad activity. It's a white-collar job. During family emergency, superiors and associates render sympathetic assistance. These are some of the reasons why, during peacetime, railroads have little trouble in filling ticket jobs, despite higher pay available elsewhere for work of similar difficulty and responsibility.

The regular line of advancement runs out after a few promotions. Seniority, compelled by union contract, determines promotion up to position of ticket agent in a fair-sized agency. A vacancy is bulletined throughout the district covered by a contract, and the "oldest" man able to handle the job is offered its refusal. After a man reaches the top job covered by contract, further promotion is up to officials. Many ticket men talk wistfully of appointment to the passenger department. But such jobs are few in number and many ticket men keep on hammering the dater year after year, hoping for the big appointment at Buffalo or Chicago or Denver or some other large ticket office. Position of small town agent appeals to some ticket men who want to settle down in one place and they therefore study freight work.

Chicago & Northwes

Prime educational asset is alertness; the ticket man must read the newspapers and know what is going on in the country. Some of the best men never finished high school, but in the ticket work, as in all other vocations, the better educated men rise to the top in greater proportion than do those who left school when young.

Vocational training divides into geography, mathematics, psychology. A map of the United States must be in the ticket man's head. He must know names of the principal railroads and where they run, relative merits of their passenger service, schedules and equipment of their trains. He must know which railroads use which stations in Chicago, Houston, Pittsburgh; he must study the *Official Guide* until he can check a schedule to any city in a matter of seconds, to a remote way station across the continent within two or three minutes.

His knowledge of geography must constantly increase, and must be matched with arithmetical information. He is told early in the game, "never check a rate without a map." He reads from the Chicago eastbound one-way tariff 278 that a first-class ticket to Baltimore costs $25.30 plus tax. The rate to Washington is the same. Each rate applies direct, or via the other point. Why? From the westbound tariff 279 he notes rates to Colorado common points, Denver, Colorado Springs, Pueblo, are all the same; they too apply direct or via the others. Ditto Dallas and Fort Worth, Los Angeles and San Francisco. This is very confusing, until study of railroad maps shows it to be the only way the different lines can compete for business. The better ticket men dig for such explanations.

The ticket man must know good money from bad, be able to make change accurately and rapidly. Some offices rate their men according to money volume of sales, which averages out to mean number of tickets sold in a week or month. Card tickets for local travel can be sold quite rapidly, but skeleton tickets require write-ins. When the rate must be looked up,

Chicago & Northwestern.

waiting ticket buyers chafe. Mistakes in making change may occur when the seller becomes excited, perhaps after long tariff investigation to find an obscure charge. Most General Passenger Agents are necessarily pretty tough customers; overages are confiscated, while shortages must be made up out of the seller's pocket. Relief may be sought and obtained from carrying lines when the seller undercollects, but if it happens with increasing frequency on the part of one man, he'd better look for another job.

Quick thought and action is necessary to the ticket seller; no pensive or dreamy individual can make the grade. Couple this with demand for invariable courtesy, and you need a good man. Selling tickets, especially now, is a touch-and-go proposition; it's fast business. Buyers approach the window with money in their hands. Maybe the train is scheduled to leave in five minutes. In busy stations, action is the rule almost around the clock, with rushes at different times, based on train schedules. There's a morning *Riley* rush at Indianapolis of people bound for Chicago. People fan in all directions from St. Louis between 4 and 6 p. m. Most big city stations have a two-hour rush beginning at 6:30 a. m., and a similar one 14 hours later.

The ticket man's dress and courteous manner must enable him to meet literally all types of people, from the president of the First National Bank who occupies a drawing room, to the little fellow whose twenty-dollar ticket purchase may be his largest. This means he must dress well and fashionably but never in loud color or flashy style. Likewise, to repeat, his manner must be courteous. Such words are very easily written.

But situations arise that heighten anyone's blood pressure. An important-looking man reaches the ticket window at 6:30 p. m., accompanied by a lady and two red caps carrying much expensive luggage. He says his name is Horace Thompson, and his secretary had reserved a compartment to New York on this evening's train. He and Mrs. Thompson, having closed their house for the summer (that seems to make a difference), will have dinner in the station dining room, and he'd like to pick up the tickets now. But the diagram discloses code numbers in both your New York compartments; no "Thompson" name reservation in any space; only uppers are available. This can become explosive.

A hard-looking gent demands a round-trip coach ticket to New Orleans. The seller makes the ticket, announces its price, awaits the money. The passenger snarls, "You're a crook. That's almost twice what you told me on the phone awhile ago! What's the idea?"

Such incidents are recounted as ticket sellers eat their lunch or drink their beer. If Mr. Thompson's secretary had actually reserved a compartment, it was on the other railroad. The hard-looker's quotation had been for a one-way ticket. Any ticket transaction makes sense. Difficulties may arise in bringing about the beautiful understanding that satisfies everyone. Tact, firmness, and a good knowledge of human nature are needed.

The ticket man must read. He has to interpret tariffs, with their pages of rules, routes, rates, reference marks. "You can't read anything into a tariff; you can't read anything out of it." That's the first thing told the young ticket seller; it means he must have specific authority, in his tariffs, for every transaction. Having the authority, he must not refuse to sell accordingly, for his employer is a *common* carrier, "holds out" as such, and is compelled by law to carry any orderly person offering to pay the proper charge. Interpretation of tariffs is a process that takes years to completely master.

Tools of the ticket seller are the *Official Guide*, timetables of his own and other railroads, tariffs, a case and stock of tickets, punch, money drawer with change money, and a dater.

The *Official Guide* shows schedules and equipment of all trains operated in North America. Timetables furnish similar information for one line only. Being much smaller, they are easier to use than the Guide. Additionally, they show rail and Pullman fares, and set forth briefly the more important routing options published by issuing railroads.

The office may maintain up to 200 tariffs, filed for instant use. They will name all rates from "this" station. Additionally, other tariffs may be kept that show all rates originating on "this" railroad, no matter where. And, for use when a passenger enroute decides to extend the limit or destination of his ticket, or exchange it for a different return route, there will be tariffs naming rates from across the continent.

Tariffs are price lists or catalogues of railroad service. Describing them is impossible here since books are written on their construction, and other books on their interpretation. In-

tense concentration is needed to understand the more involved rules.

Tickets themselves are divided local and interline, card and coupon, one-way and round-trip, punch-limit, paster contract and in many, many other ways. The tariff out of which a ticket is sold may prescribe form of ticket to be used. Some tickets have printed boxes or circles to show, when punched, route, destination, transit or return limit, half-fare, baggage check. In the old ticket-scalping days the ticket seller could show, by appropriate punch mark, the sex, estimated weight, height, color of skin and hair of the purchaser.

Functions of the money drawer and change money are self-evident. Having sold a ticket, the seller drops the money into his drawer, along with ticket stub. The drawer may be part of a cash register. At end of the day the man must have his change money, and enough more to pay for his stubs.

Ticket dater makes the seller's own "fingerprints." Its impression on the reverse side of a ticket evidences forever the name of issuing line, office and date of sale, and seller issuing. (The last-described item may be omitted in small offices.)

A new tool is promised for ticket sellers when material shortages end. This is the ticket printer being developed by a cash register maker. To win adoption, it must promise economy, perhaps greater speed in ticket issuance.

As a full-time railroad employee, the ticket seller is legally entitled to free transportation for himself and dependents. All roads grant more free transportation with increasing years of service. Railroads in western territory have promulgated rules to govern issuance of passes, and so have eastern lines and the southern lines. Any railroad complies rather strictly with regulations it helped to make for railroads in its own territory, but rules in one territory do not coincide with rules in another. Among the lower-paid railroaders, the ticket men fare well in the matter of free transportation.

Formerly, ticket sellers were "complimented" by connecting lines. A complimentary pass is one issued without official request from employing carrier. Thus, a Rock Island man stationed in Iowa would proudly show his wife annual passes on New York Central, Pennsylvania, B&O, Southern Pacific, D&RGW. Rock Island officials might never know how many foreign-line annuals their ticket boys did have. But that was all right; Rock Island was complimenting ticket sellers on New York Central, Pennsylvania, etc. This practice was abandoned in the past decade because of the great burden it placed on the issuing line and now, according to executives, no pass will be issued without official request.

The ticket seller is bonded to protect his employer's money. In a day's time he will take in from $100 to $1500 or maybe more. Inherently he is honest, and is therefore a good risk for the bonding company. He is afraid of the bonding company ("They'll never quit looking for you, even for 50 cents"). He may know no other work, and after converting or embezzling company money, would be unable to secure employment. He is a family man and may be buying his home. Despite his limited pay and great financial responsibility, he almost never goes bad.

Today's ticket seller is pretty certain to be a home guard; chances are he's either 4-F or over draft age. But in the old days and for a few years after World War I, ticket sellers boomed the country just like train crew members and telegraph operators. The practice waned about two years ago, and it stopped completely in 1930 because the boomer couldn't find a job. Since 1940, railroads have been advertising for ticket sellers, and training them for the work. But most men able to sell tickets can make twice the money in war work, so the recent increased demand for ticket sellers has not brought back the boomer in any great numbers. It has brought some women into the ranks.

Formerly, the ticket seller could make extra money in ways now denied him. Tourist and vacation pleasure travel requires a large amount of advance planning, and the ambitious ticket man once could study literature of resorts and parks in Florida, Colorado, California, Mexico, and other places, and issue tickets for their accommodations. Nice commissions were paid on the business and all parties were satisfied. It relieved passengers of worry about reservations and assured them they wouldn't waste money on less desirable sightseeing. The originating railroad usually enjoyed its long haul. The concessionnaires were happy, because competitors were shut out. Recently, however, some railroads announced such commissions (or 50 per cent of them) would be considered company revenue. This, of course, discouraged

such transactions or led to devices to evade the company's demand. And since the war, tourist travel has shrunk to very little.

The ticket man enjoys the world's lowest-priced de luxe vacations when he travels independently. He can visit any tourist region at no cost for rail transport, and with free or half-rate Pullman accommodations. Hotels will put him up for nothing, or at reduced rates; park sightseeing companies will compliment him. All this because of the business he can send them over the years. The ticket man may join his home town civic club. This is encouraged by the employer, who may even pay the fees. It's good advertising, as club members travel.

Membership in American Association of Railroad Ticket Agents is available for a nominal fee. Membership includes subscription to a monthly magazine that keeps his education up to date with its advertising and editorial columns. Its fraternal insurance may be purchased by members.

Until the war, the association sponsored a vacation trip late each summer for those members fortunate enough to have the money and vacation assignment coinciding with the train's schedule. One year, special trains were operated from St. Louis to Mexico City. Another year, the vacationers went from Chicago to parks in southern Utah reached only by Union Pacific, returning direct or via Yellowstone. Once the itinerary included Niagara Falls, the St. Lawrence and Saguenay rivers. Ticket agents have gone all over the continent on their annual junkets, luxuriating with the best of everything.

These trips beget private cynicism, because most members of the party are there to make a living by taking in the other fellow's washing. Cultivating ticket agents of connecting lines is good business for any railroad; the ticket men route more tickets than any other one class of Americans. Therefore, any railroad considers it an honor to handle the ticket agents' special, on which it earns no revenue. If the train were filled with ticket agents and sellers, well and good.

But prices charged for these trips, on an all-expense basis, are so high they shut out the small fry. Unless a ticket man's wife is working, he can hardly afford to spend two or three hundred dollars for his annual vacation, or double that if accompanied by his wife. Interest of the auditor, and of the bonding company, would be aroused by repeated journeys too close together. Association membership is also open to passenger solicitors, who make more money and who have expense accounts to boot. It works out the specials carry as many passenger men as ticket men. Their goodwill is valuable, too; anyone's goodwill is valuable. But it does seem strange to witness Northern Pacific passenger officials cultivating Great Northern solicitors on a train coming out of Gardiner.

Any large city with numerous railroad offices will have its Passenger, Passenger Traffic, or Passenger Transportation club. Membership is open to ticket sellers, ticket agents, and the passenger solicitors. Club functions are standardized the country over. When the weather is nice, there are outings; at any time, formal or buffet dinners may be held. The members gather to eat, drink, and gamble for small stakes at the regular meetings, or special ones called to do honor to notables, retiring oldsters, members transferred out of town. And in the days when all overland travel was by rail (which people term the good old days), these local clubs organized their own week end or holiday trips, traveling in some instances as far as a thousand miles by special train.

So, all in all, it's a pretty good calling, especially if you like it. After you get a year's whiskers, your job is steady. It's hard work, but good men like hard work.

Apropos

This happened years ago when I was a *simple* traveling passenger agent. We were riding in a railroad business car (never say private car), attached to a mixed train meandering through Minnesota meadowlands over a Milwaukee Road branch line. It was a delightful summer day.

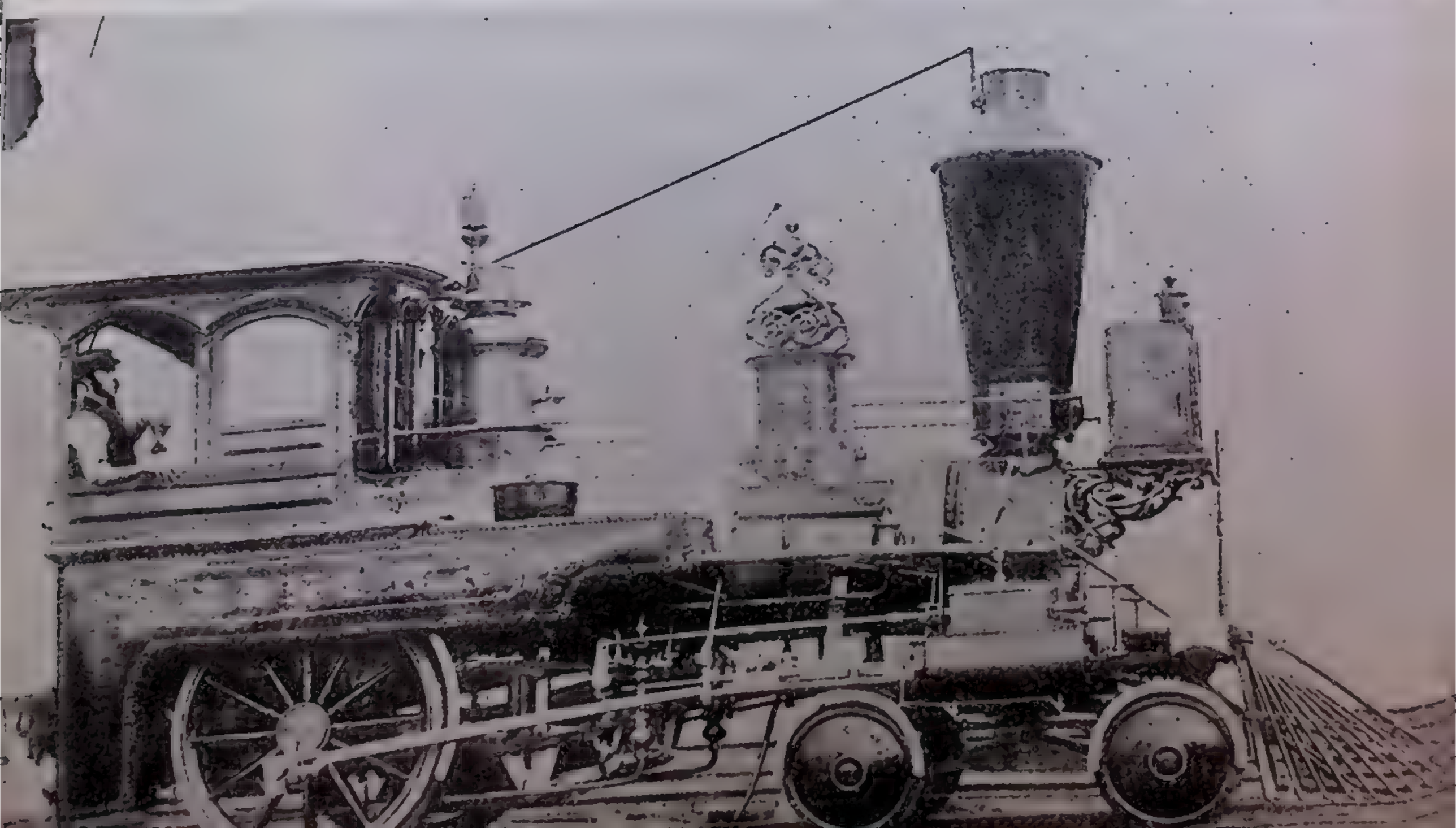
At suppertime (we didn't say dinnertime in those days) our division freight agent, a poetic soul, rested knife and fork, folded his hands, gazed momentarily and almost reverently remarked, "Gentlemen, framed by the window is a most beauteous pastoral scene. Behold the lowing herd, wending its weary way at eventide."

Our freight traffic manager shot a quick glance and, without stopping to swallow the morsel he was masticating, laconically remarked, "They'd just fill a 40-foot stock car."

Frank J. Newell,
Assistant Public Relations Officer,
The Milwaukee Road.

Tall Stacked Old Timers

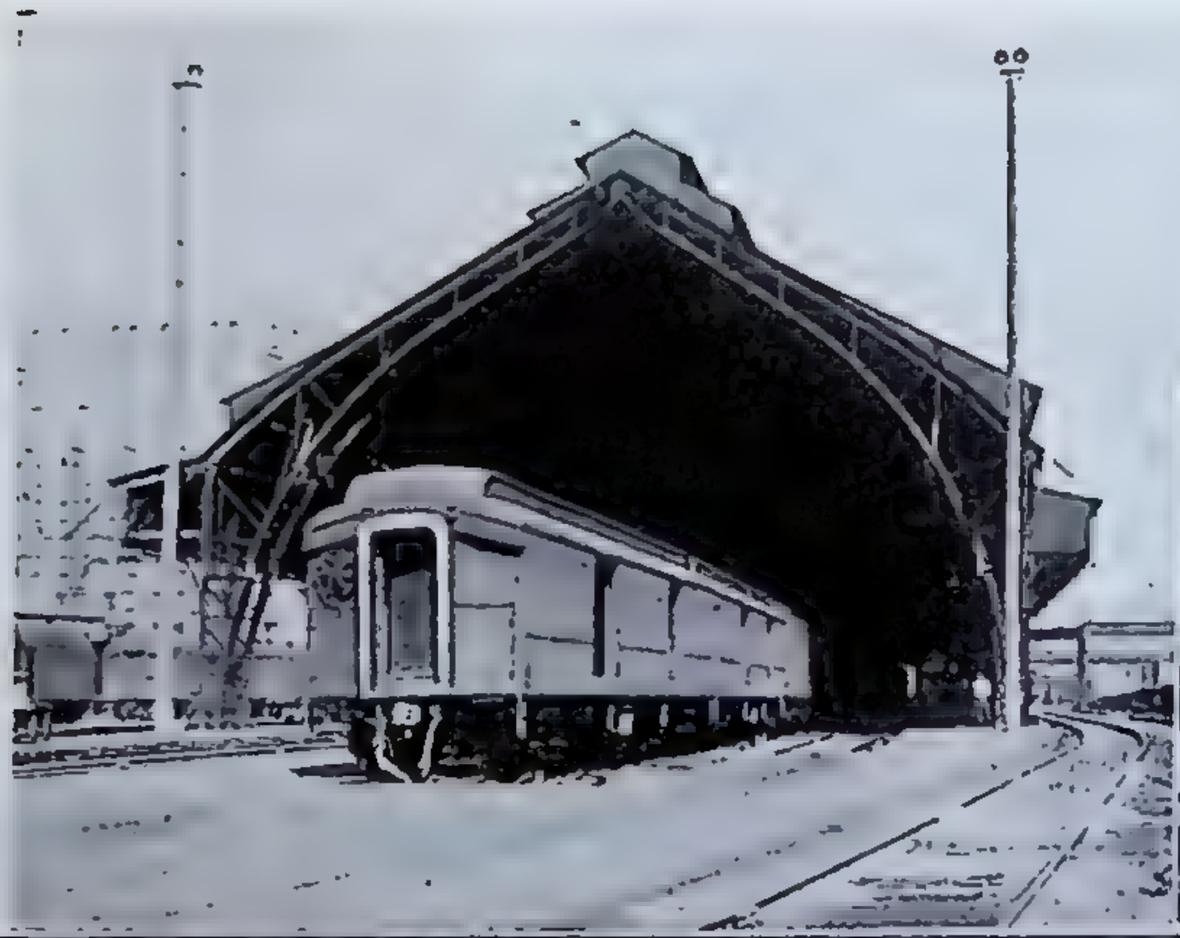
Three gems from a leading locomotive photo collection



Now the stack has almost disappeared into the smokebox, but there was a day when tall ones and fat ones, diamond stacks, straight stacks, sunflower, ionic and tapered could all be found on the locomotives of the country. Each builder had his own ideas and the master mechanics were not above having their own personal prejudices. All agreed that the locomotive must have draft and that the sparks must be arrested.

These three beauties are from the old-time collection of C. E. Fisher, 20 Wilde Dr., Waban 68, Mass. The Admiral, No. 9, ran on the Louisville, New Albany & Chicago (now the Monon) and was a product of their own shops in the late seventies. She was probably about 60,000 pounds with 15 x 22-inch cylinders and 60-inch drivers, and she must have been a beauty in that Russia iron jacket, all that brass work and red and gold paint.

The Hackensack of the Hackensack & New York Railroad was one of two locomotives that the Rogers Works built for that road in 1860. It was Rogers No. 955, September 29, 1860, 9 x 16-inch cylinders and 54-inch drivers. It looks as if there must have been some kind of a damper in the top of the stack judging from that cord reaching to the cab. Baldwin built the Chatham for the Western Railroad of North Carolina, construction No. 1469, March 16, 1866. She had 13 x 24-inch cylinders, 56-inch drivers, and weighed 20½ tons. This rather neat and fancy looking job with its bowed windows must have appealed to any engineer.



Chicago Station Gets New Shed

Illinois Central tears down old high arch and builds slotted roof

With the passing of the old high trainshed from Central Station, the Illinois Central's passenger terminal at Chicago, that city has lost one of the prominent landmarks of its lakefront skyline. Standing just south of Roosevelt Road, formerly Twelfth Street, since the days of the Columbian Exposition in 1893, this trainshed rose 61½ feet above the rails and provided a coverage 610 feet long for the six station loading and unloading tracks.

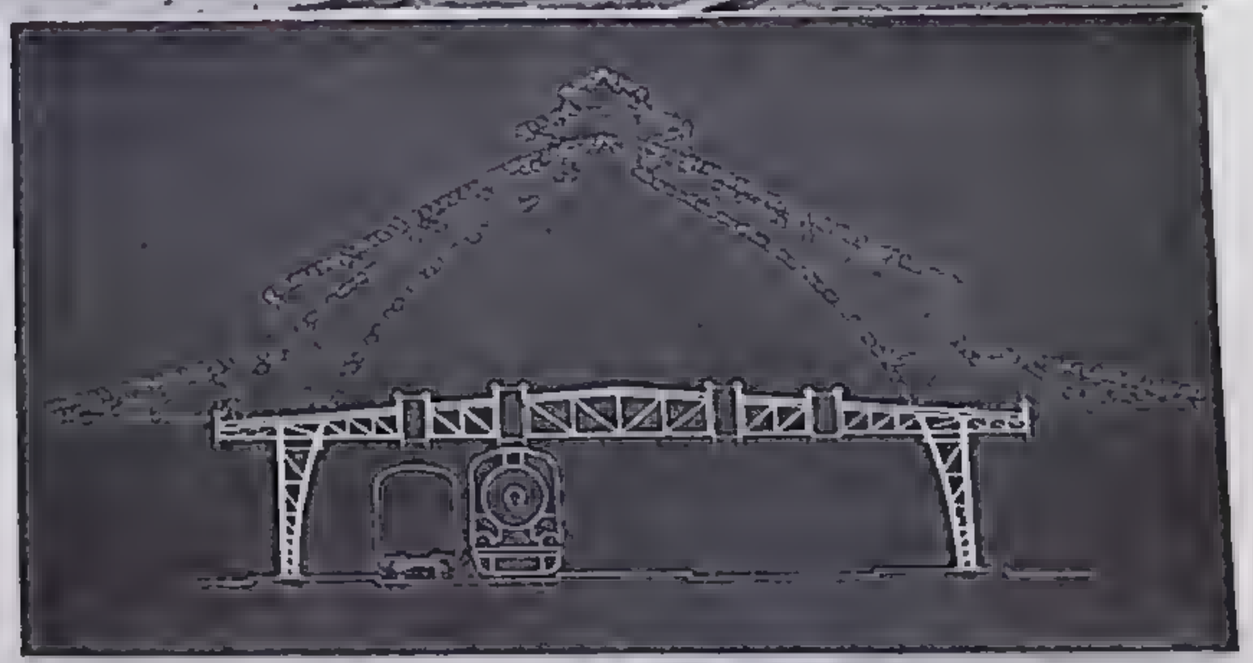
It now has been replaced by a modern, low, flat roof type of structure rising only 23½ feet above the rails—a reduction of close to two thirds in total height, yet retaining the same track coverage. Incidental to the reconstruction, 710 tons of steel from the old framework were sold as scrap.

The Roosevelt Road street car tracks, which were originally routed through the upper part of the old shed to serve the Century of Progress World's Fair visitors of 1933-34, now pass over the top of the new shed.

The remodeling job on the trainshed was undertaken because it was found that the metal in the roof had deteriorated to such an extent through corrosion from locomotive gases that

it could not be economically repaired. As supports for the new shed, there were retained, however, the lower portions of the existing columns. This permitted the railroad to erect all of the new steel before any of the old steel was removed without interfering with normal use of the station. The new framework required 394 tons of steel.

An unusual detail in the new roof deck was its construction of corrugated transite, an asbestos-cement material usable like lumber, which provided the structural portion of the deck.



All photos courtesy Illinois Central.

On Order

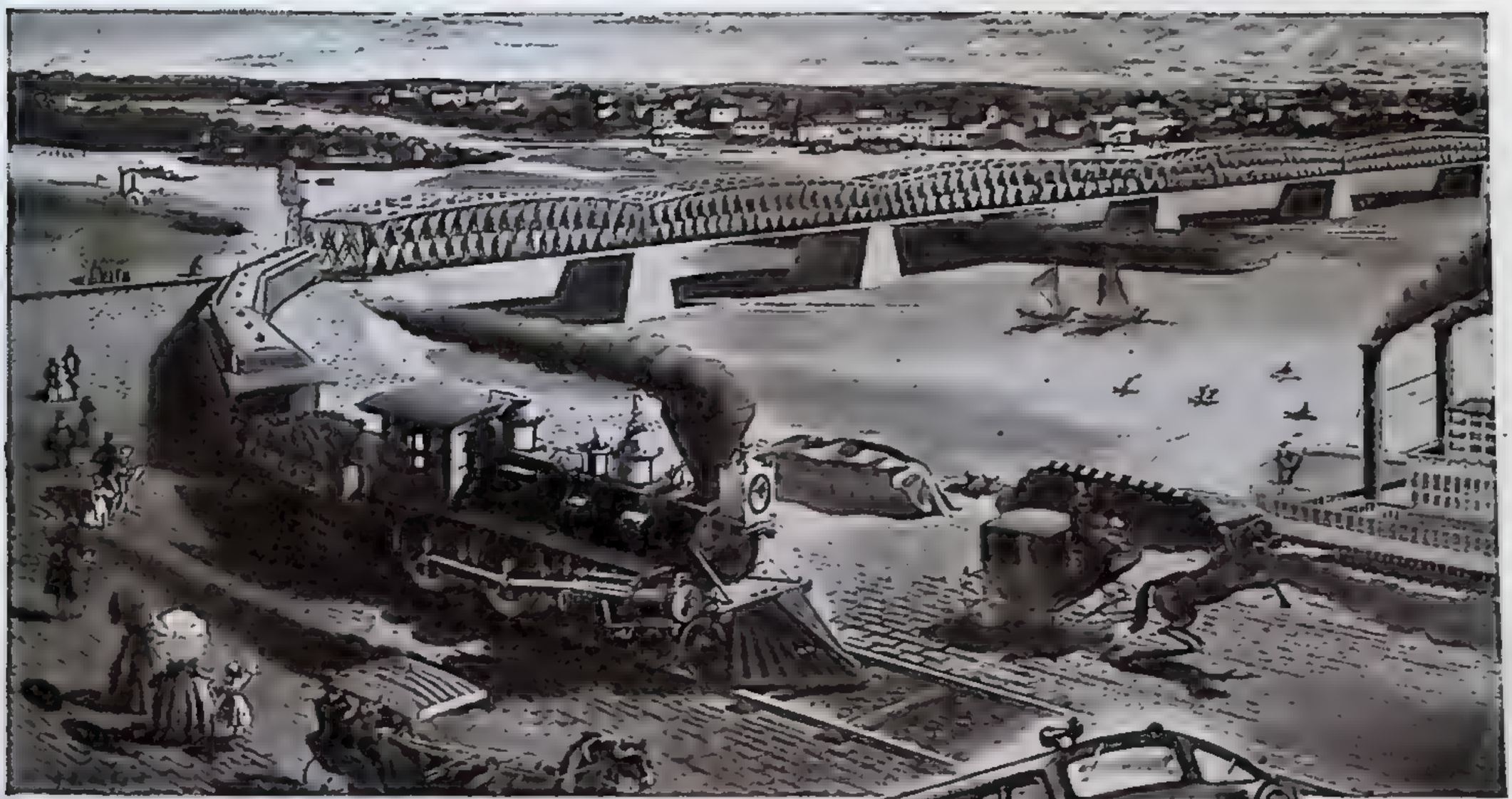
FOR TRAVEL DELUXE

Two of the world's newest and best trains for daytime travel are now on order for the C&EI—fast streamliners, incorporating the most advanced features of modern power and car design. Even though it may be months before these trains can be delivered, the C&EI program for providing the finest possible transportation and service is a reality, and is already under way.

One of these streamliners is scheduled for a round trip daily on the Chicago-Evansville route; the other will serve central and southern Illinois.

In calling attention to these new trains, it must be emphasized that their building depends upon war conditions—upon the release of men and materials for passenger car construction. But we believe that travelers, who have been patient and cooperative under conditions of wartime congestion, are entitled to a preview of deluxe C&EI transportation to come . . . not "dream" trains, but fully engineered and ready for building.

CHICAGO & EASTERN ILLINOIS RAILROAD



October 10, 1852, the famous Rock Island steam train, the "Rocket," made its initial trip between Chicago and Joliet, Ill. Several years later the Rock Island Lines opened the first bridge across the Mississippi. With true poetic license, the artist has brought these two events together.

The Rock Island Lines operate a fleet of fast and powerful General Motors Diesel freight locomotives known as the "Hercules." They are fitting railmates indeed to the General Motors Diesels which power the new and modern Rock Island "Rockets" of today.

GREAT THINGS ARE HAPPENING IN TRANSPORTATION

When people discuss travel you'll often hear mention of the big, powerful Diesel locomotives that are hauling so many of America's crack trains.

You may, or may not, know that by far the greater number of these new and modern locomotives are built by General Motors. Railroad men know it. And they will tell you, too, how these amazing GM Diesels have changed all previous ideas of speed with comfort and safety for passengers; how they have effected economies and efficiencies beyond all previous railroad experience.

It may be your good fortune to ride behind one of these passenger Diesels on your next railroad trip. Or, perhaps you have seen one of these powerful freight locomotives pulling a mile-long loaded train. If so, you'll know why it's a great new day for railroading—with even greater days to come.

ON TO FINAL VICTORY
BUY MORE WAR BONDS

GM
GENERAL MOTORS
DIESEL POWER

LOCOMOTIVES . . . . . ELECTRO-MOTIVE DIVISION, La Grange, Ill.

ENGINES . 150 to 2000 H.P. . . CLEVELAND DIESEL ENGINE DIVISION, Cleveland 11, Ohio

ENGINES . . . 15 to 250 H.P. . . . . DETROIT DIESEL ENGINE DIVISION, Detroit 23, Mich.

The London Underground

This excerpt is from a letter to Howard Gruenberger of Milwaukee, from T. C. Lawton, Surry, England, dated Jan. 1, 1945:

"You have to remember that London and New York are two places which could hardly be more opposite to each other if they tried. Perhaps if I tell you about the London Underground you will be able to get a better picture. Much of it is very deep. The Picadilly line has a considerable stretch of about 250 feet below the surface and it runs mostly in pairs of single-track tunnels which the trains practically fill. The stations are sometimes island platforms between the tracks in a single large tunnel; at other places one track runs immediately below the other. Within the center of the city, that is within a radius of some seven miles or so, the lines are entirely in tunnels. The tunnel of the northern line from Morden to north of Highgate is 60½ miles long, the longest in Europe. It is designed for shifting large numbers of people quickly and thus has trains running at peak hours as closely as 45-second intervals.

"No express traffic where trains skip stations is practicable because there are only two tracks, but the trains accelerate at a very good rate so that terminal to terminal speeds are quite comparable with New York's express trains.

"Once outside the city, the underground comes up for air and then proceeds like one of your interurbans, stretching out as much as 20 to 30 miles from the center of town. Many of these outside extensions are fairly new, and their stations are very pleasing and modern both in layout and architecture.

"The standard train, latest design 1938-39, consists of seven cars, four motor cars and three trailers, arranged alternately. The colors are red and cream. Each car is 52 feet long and runs on six-foot, 3-inch trucks, with the truck centers 33½ feet apart. Each motor truck develops 168 horsepower and all switch gear is under the floor. Cars have two sets of double sliding doors at equal intervals along the side and two more single doors at each end of the car. A seven-car train can be driven from any motor car and can be split as required. The doors are opened and closed by compressed air worked from a central control by the conductor. Should something crack in the control system a push button by each door opens it as required.

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End of line on now abandoned Cincinnati & Westwood. Small turntable was used to turn speeder which made daily runs to hold franchise.

Unusual People

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—*B. & M. Magazine.*

Union Pacific Challenger type locomotive at Los Angeles Union Station.

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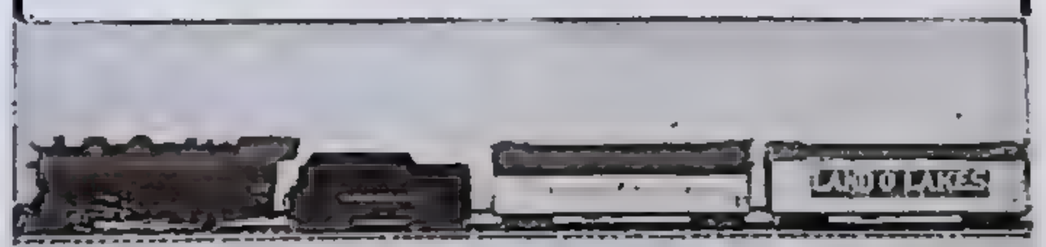
E. W. Hont.

OWN YOUR OWN RAILROAD



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8 LIMA 2-6-6-6s

for the HEAVY TRAFFIC on *The Virginian*

To handle its heavy coal traffic still more efficiently, The Virginian Railway has just placed in service eight Lima 2-6-6-6 locomotives.

These four-cylinder, six-coupled articulated giants are capable of hauling the heaviest freights, over mountain grades, at sustained high speeds.

LIMA LOCOMOTIVE WORKS, INC., LIMA, OHIO

The London Underground

This excerpt is from a letter to Howard Gruenberger of Milwaukee, from T. C. Lawton, Surry, England, dated Jan. 1, 1945:

"You have to remember that London and New York are two places which could hardly be more opposite to each other if they tried. Perhaps if I tell you about the London Underground you will be able to get a better picture. Much of it is very deep. The Picadilly line has a considerable stretch of about 250 feet below the surface and it runs mostly in pairs of single-track tunnels which the trains practically fill. The stations are sometimes island platforms between the tracks in a single large tunnel; at other places one track runs immediately below the other. Within the center of the city, that is within a radius of some seven miles or so, the lines are entirely in tunnels. The tunnel of the northern line from Morden to north of Highgate is 60½ miles long, the longest in Europe. It is designed for shifting large numbers of people quickly and thus has trains running at peak hours as closely as 45-second intervals.

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LIMA LOCOMOTIVE WORKS, INC., LIMA, OHIO

Doin' it with Diesels on the Santa Fe

Hauling mile-long war freights over steep mountain grades calls for plenty of head-end power.

Santa Fe is providing a lot of that power with the greatest fleet of 5400 horsepower Diesel locomotives in American railroading.

68 of these blue and yellow "head-ends"—the most powerful freight Diesels in the world—are now in operation over the toughest mountain climbs on the Santa Fe—*and more are on order.*

Santa Fe's dieselization program is another important step in getting the war freight through faster along "The Route to Tokyo"—and in providing the most modern freight equipment to meet transportation needs in the days of peace to come.

Six of the big fleet of Santa Fe freight Diesels at a service base.

Santa Fe

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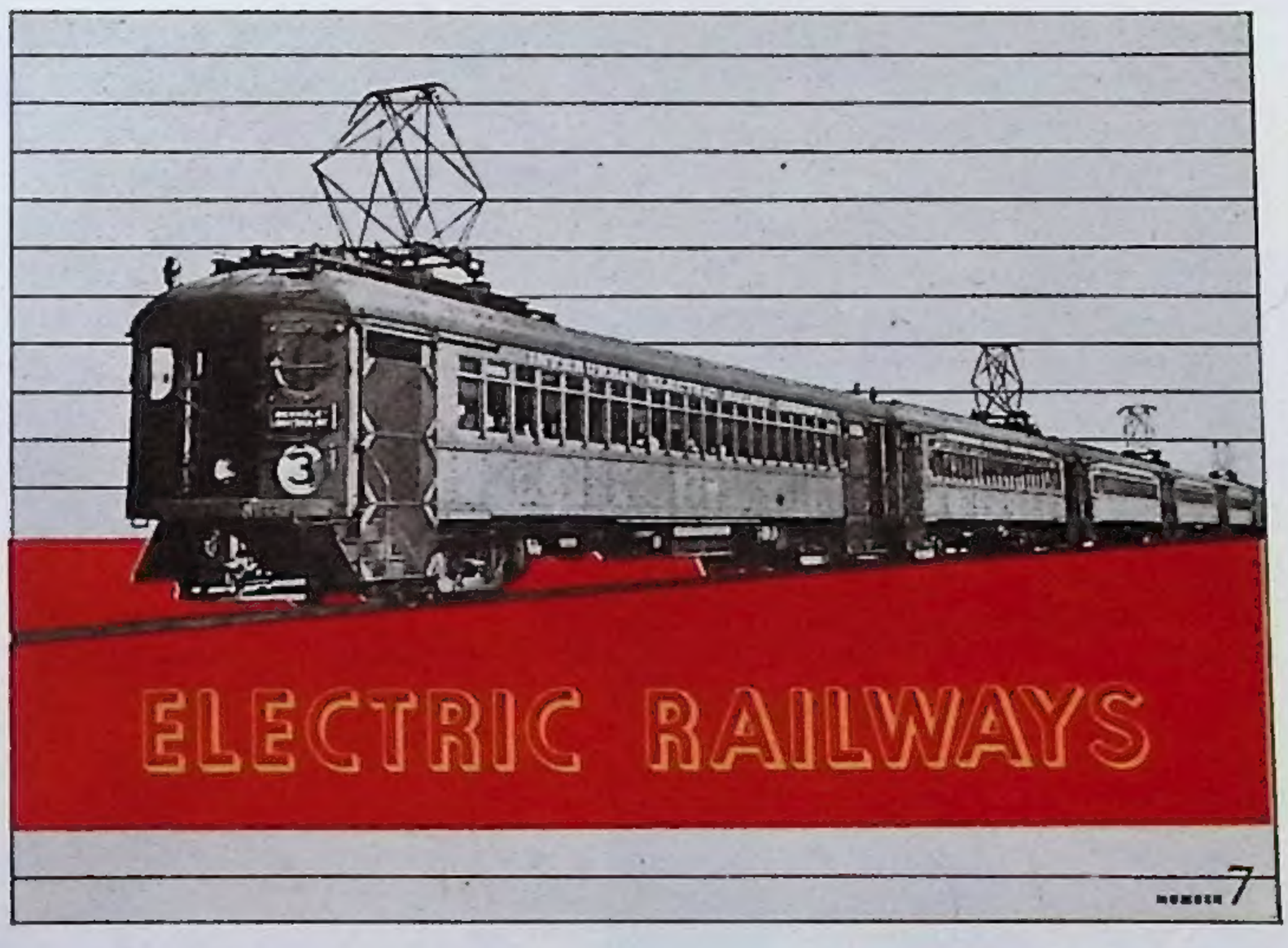

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6. New England railroads $1
7. Electric railways $1
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9. New York Central Railroad ...$1

Railroad Books

10. **Railroad Panorama**, by A. C. Kalmbach. A general book about the American railroad scene, of which Railroad Magazine says, "For pleasant reading we recommend Railroad Panorama . . . written in an easy, conversational style." The Railway Gazette says, "It makes good reading." And the editor of The Model Builder says, "Seldom has it been my pleasure to read a book written with such infectious enthusiasm, and abounding with such warmth and color. It has removed much of the corporate coldness of railroads large and small and has breathed life into them." 20 intriguing chapters, 224 pages of text, 32 pages of railroad photos. $2.75

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12. **Deluxe Railroad Photo Album No. 2.** The second series of albums (Nos. 5 to 9 above) combined in an extra fine heavily padded binding. More than 200 photos. $10.

13. **The Louisville & Nashville Railroad.** By Kincaid Kerr. A well-illustrated history, complete with a good map of the system. 210 magazine-size pages. An excellent value. $1.75.

14. **Clear the Tracks**, by Joseph Bromley. An epic autobiography of an old-time locomotive engineer who went to firing at the age of 16 on the old Black River Line and became a Lackawanna engineer at 20. Never a dull page in this book! $2.75.

15. **Transport for War**, by Edward Hungerford. The dynamic story of what rail transport is doing in the wartime emergency, and how the railroads prepared for heavier traffic long before it came. Reduced to $1.50.

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17. **Iron Horses**, by E. P. Alexander. A collection of authentic prints and lithographs, with case histories, of American locomotives from 1829 to 1900; 293 large pages, 98 illustrations, many of them rare collectors' items. $5.00.

18. **Trains, Tracks and Travel**, by T. W. Van Metre. The standard book on railroads for the layman. Well written and well organized to cover every angle of railroading. Generously illustrated. $3.50.

19. **The Steam Locomotive**, by Ralph J. Johnson, M. E., chief engineer Baldwin Locomotive Works. An authoritative treatise on the theory, operation and economics of the modern steam locomotive. The only recent sound technical text on the subject. 500 pages, 100 drawings and photographs, tables. $5.00.

Prints and Maps

20. **Railroad Map of Colorado.** Lithographed in four colors, size 38"x24". Shows every railroad ever built in Colorado and important projected lines. Fully indexed. Includes brief descriptive remarks on Colorado railroads. $1.00.

21. **Railroad Map of Pennsylvania.** Lithographed in three colors, size 17"x22". Complete, accurate, fully indexed. 50c.

22. Above maps rolled in mailing tube instead of folded, either one or both, 50c extra. Not mailable overseas.

23. **Westbound Freight.** A beautifully executed watercolor painting showing caboose end of a freight around curve. Picture size 14"x9" on a 19"x12½" heavy sheet of paper; no printing; mailing tube. $1.00

24. **Noonday Water Stop.** A water color painting of a locomotive taking water, reproduced in every color and shading. Same size as item 23. $1.00.

25. **Union Pacific "Big Boy" in Weber Canyon.** A striking Kodachrome photo reproduced for framing, same size as items 23 and 24, rolled in tube. $1.00.

26. **Way Station**, by Capt. A. Sheldon Pennoyer. Striking reproduction of original oil painting of train time at small country station 75 years ago. $1.00.

Model Railroad Books

27. **Model Railroader Cyclopedia.** Standard reference book of the model railroad hobby. Contains short text material on modeling methods; basic signaling circuits are also given together with plans for all types of equipment. Cloth binding. $3.00.

28. **Handbook for Model Railroaders**, by W. K. Walthers. The complete model railroad handbook for beginners. 210 well-illustrated pages. $3.00.

29. **How to Run a Model Railroad**, by Boomer Pete. A practical manual on model railroad operation, including various schemes for realistic operation by standard railroad operating rules. $2.00.

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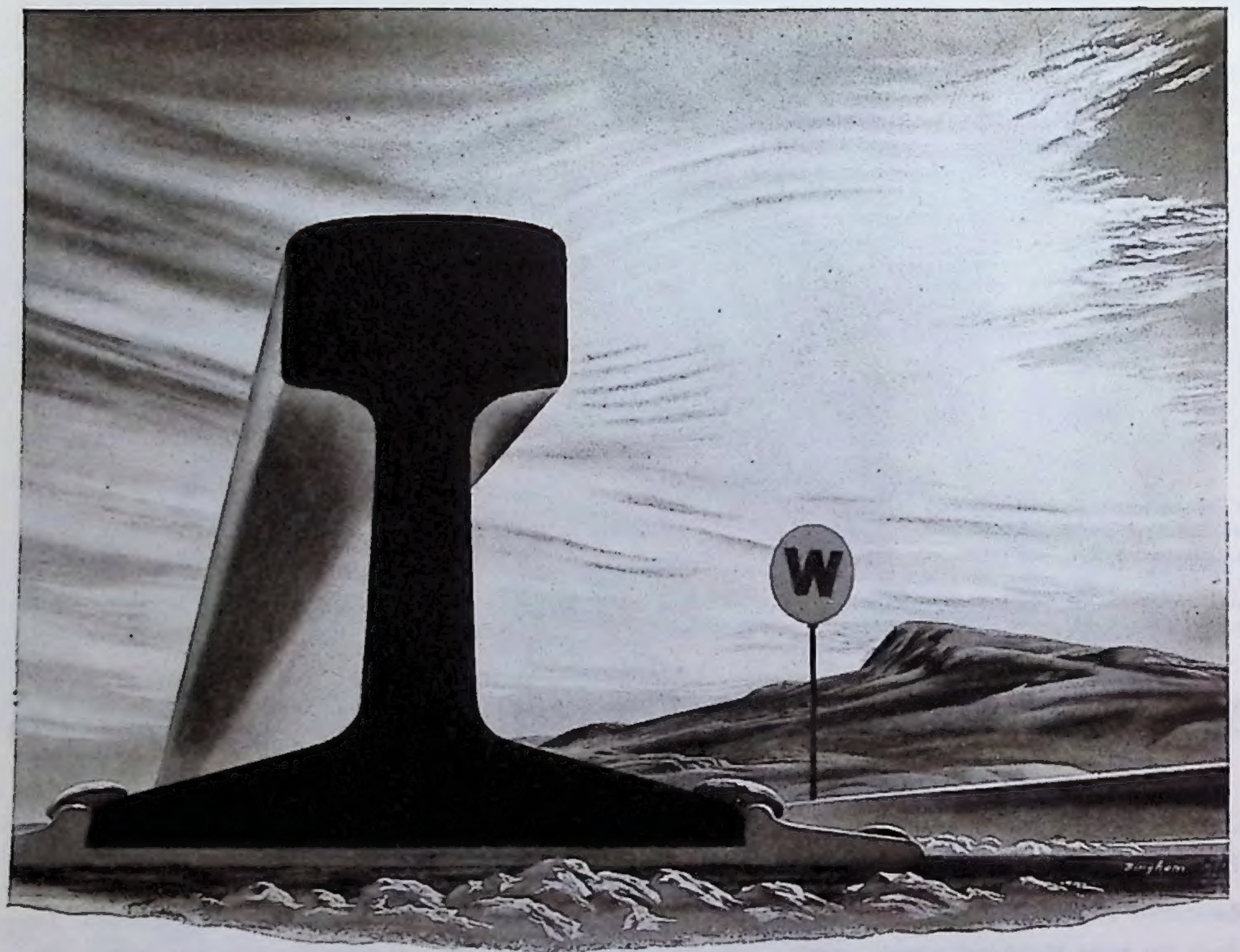

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"High Iron" is one of America's not-so-secret weapons. It is a railroadman's term for the 230,000 miles of mainline track — built, paid for and kept up by the railroads — which knit America together. • Over these strong highways of steel moves America's might — three quarters of all intercity transportation, 90% of all war freight. • In this mass movement of freight — a movement that far exceeds anything moved before by any means of transport — lies a vital lesson. • The lesson is this: America needs and must have — for success in war, for prosperity in peace — the low-priced, mass transportation which only railroads can deliver.

ASSOCIATION OF
AMERICAN RAILROADS
All United for Victory

Correspondence

The Santa Fe now uses an old Lidgerwood at the Albuquerque shops to "skim" the tires on engines which do not need very much taken off the tread. The cable is run through a sheave wheel attached to a solid bumping post and the free end coupled to the engine and Lidgerwood. The brakeshoes and heads are removed and a cutting tool the width of the tire tread is attached to the brake beams. The brakes are applied and, when the cable is reeled in, it draws the engine along taking a light cut from the tire treads. This saves the time it would take to put the engine over the drop pit and drop the wheels.

C. M. Graham, 1201 8th St., Las Vegas, N. Mex.

I would like to submit "Birds and Worms, N. Y." as one of the most unusual names of a station. I found this listed in the index of my 1879 and 1883 *Official Guides* as a station on the Rochester & State Line Railway. It was not shown in the schedule, so I do not know the exact location.

E. M. Neff, 2557 Lagoda Ave., Springfield, O.

A fascinating English pastime is timing trains, recording the times at each station or at prominent stations during an actual run. Many an unusual bit of performance turns up this way. Undoubtedly many Americans indulge in this same hobby, but do they keep records? I never see timings in your magazine. Here's a routine run to start the ball rolling. Following your suggestion in the October, 1944, issue I rode the North Shore Line *Electroliner* on the 5 p.m. run which is nonstop from Howard St., Chicago, to Kenosha, Wis. Here is the log at key points, as well as station to station speed averages which can only be accurate to the half-mile as the timing was no more accurate:

Station	Time	Miles from last station	Speed from last station
Skokie	Past 5:38:10		
South Upton	Past 5:52:05	17.28	74.5 m.p.h.
Zion	Past 6:06:55	12.95	52.5 m.p.h.
Kenosha	Stop 6:13:30	8.70	79.5 m.p.h.
Kenosha	Start 6:14:35		
Racine	Stop 6:23:30	10.01	60.5 m.p.h.
Racine	Start 6:24:45		
Harrison	Stop 6:43:00	20.08	66.0 m.p.h.

Average speed Skokie to Harrison (Milwaukee limits) based on actual running time was 66½ miles per hour.

John Niebelung, Fort Wayne, Ind.

Despite the war the St. Louis Railway Enthusiasts still meet the third Monday of each month at the Frisco's Tower Grove station, 1500 S. Vandeventer. The public is welcome. Membership is free.

Old Member, St. Louis, Mo.

I had quite a thrill last Saturday riding the *Montrealer* from Washington to Baltimore. Just before departure from Washington the train moved out of the station a short distance (I wasn't on yet) and two private cars were brought in and switched over. No. 168 then was brought back and coupled. The governor general of Canada and his charming wife were the occupants and very graciously sat in plain view on the last car and bowed to the quickly gathered crowd of rubbernecks.

John G. Woltereck, 502 Hollen Rd., Baltimore 4, Md.

French railroading is a gentle affair. No flying switches, no blasting exhaust at a start. One look at the couplers tells the story. Instead of our 5 x 7 automatic couplers they use hook-and-link with a double thread device to pull cars tightly to buffers. The screw can't be over two inches in diameter. Yard operations are with flags, gesticulations and the dammed "peep, peep" whistles.

Capt. Alex Darragh, U. S. Army.

Running Extra

None will be happier than the editors of TRAINS when paper rationing is relaxed, for we have worked under a tremendous strain these last three years. Sounds queer, but it's much, much more work to edit a 20 page article tightly into 18 pages than to fluff that same article out into 24 pages, as is so often the normal procedure. Yet we have managed to work into our reduced number of pages the same, or even more, factual content than we put in TRAINS before rationing.

We've learned many brand new editorial tricks doing this. You most likely do not notice them and perhaps you only realize what we've accomplished if you compare the information you glean from a present issue of TRAINS with what you learned from a 1941 or 1942 issue. The page-counters no doubt miss the point altogether. But when paper is off the rationed list our bag of tricks will remain, and watch what we'll do then! We'll satisfy both the page-counters and those who measure up the content by quality as well as by quantity.

Since TRAINS was new just before the war our paper ration has been much slimmer than that of more established publications and we have had real troubles keeping you supplied with a good magazine. But lack of paper now has not kept us from planning all the things we will do when paper is freely available to all comers. Watch for the things we have stored up: Many more photographs, greater variety of articles, more short semi-technical material, more full color illustrations. Tell your friends who can't get TRAINS now that we'll soon (we hope!) have plenty of copies to go around, and a lot more magazine in each copy.

Trains readers who wish to have their copies bound in annual volumes are urged to send their sets in immediately. In order to have the work done at a reasonable cost, the bindery waits until a quantity of work has accumulated. The next regular lot goes to the bindery in July and will be delivered in August. The charge for this service is $2.50 for one volume.

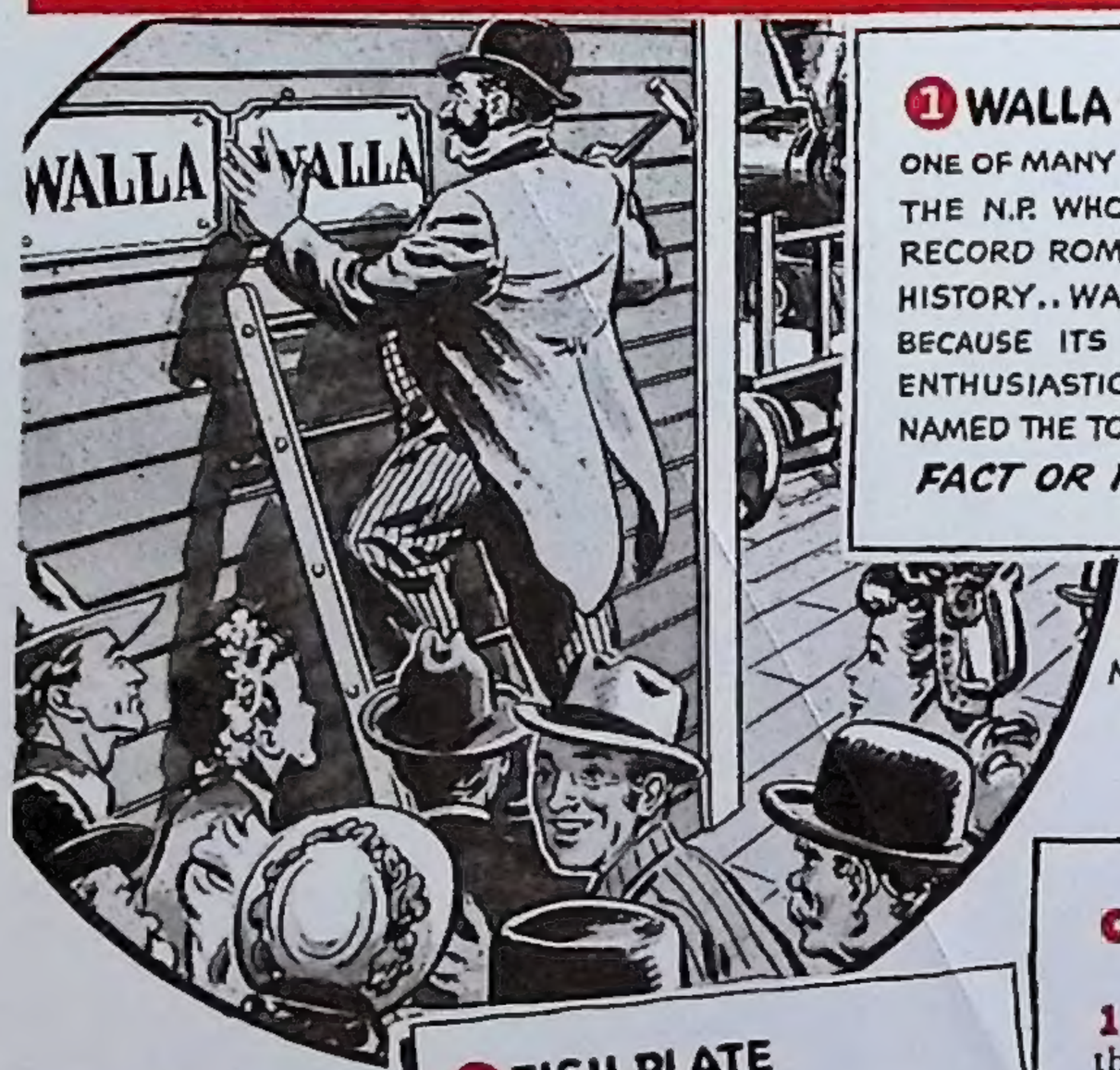
Back copies of TRAINS are scarce, but we do have a limited supply of some issues. Those on hand now, and available for 25 cents each postpaid, are: January 1942; all of 1943 except January and July; all of 1944 except January and February; January, February, April and May of 1945. We also have a beautifully bound completely indexed volume of the last complete magazine year, November 1943-October 1944. This sells for $4 postpaid. A few flat opening looseleaf binders especially made to hold 12 copies of TRAINS are available at $2 each.

Kalmbach Publishing Co.

1027 N. 7th St. Milwaukee 3, Wis.

FACT OR FICTION?

QUICK QUIZ ON NAMES AND NICKNAMES



1 WALLA WALLA... ONE OF MANY TOWNS ON THE N.P. WHOSE NAMES RECORD ROMANTIC HISTORY.. WAS SO CALLED BECAUSE ITS CITIZENS ENTHUSIASTICALLY NAMED THE TOWN TWICE! *FACT OR FICTION?*

2 SHOO-FLY IS THE RAILROAD NICKNAME FOR THIS FRINGE WHICH HANGS NEAR TUNNELS AND LOW CLEARANCE BRIDGES. *FACT OR FICTION?*

3 FISH PLATE IS TRAINMEN'S SLANG FOR A COLD LUNCH. *FACT OR FICTION?*

4 "HORSE HEAVEN" HILLS IN THE YAKIMA VALLEY GOT THEIR NAME AS A NATURAL PARADISE FOR WILD HORSES, *FACT OR FICTION?*

5 "MAIN STREET" NICKNAME FOR N. P. ROUTE WAS FIRST CONCEIVED BY INDIAN SCOUTS. *FACT OR FICTION?*

CHECK YOUR ANSWERS HERE:

1. Fiction. That's a popular local joke, but the name is actually from the Indian language and means "flowing water". Some N. P. towns and cities were named for soldiers who guarded the railway's survey parties (e.g. Custer, Miles City) . . . others for early N. P. presidents (Billings, Perham, Villard, Oakes, Hannaford) . . . still others for pioneer railroad workers, their daughters and wives. Eltopia, Washington was first named Eltopai ("Hell-to-pay") because a cloudburst washed out the railroad there, during construction days.

2. Fiction. The fringe, a safety device which warns trainmen on tops of cars to duck instantly, is called a "tell-tale". A "shoo-fly" is a temporary track built around an obstruction.

3. Fiction. Fish plate was name given old-time rail fastening, now known as joint bar. It takes more than half a million of them to link the N. P. main line from St. Paul to the Pacific.

4. Fact. High, grassy plateaus in these hills once supported thousands of spirited horses. Today most have disappeared. However, Northern Pacific carries wheat now grown high in Horse Heaven.

5. Fiction. As the Northwest grew, many of its important population centers flourished on the Northern Pacific—thus, the line has become the "Main Street of the Northwest".

NORTHERN PACIFIC

Main Street of the Northwest